Alphomism and Modern Science

'It's a completely fascinating and original take on many of the problem areas in science and philosophy and also on previously taken for granted areas. It should certainly have wide distribution and deserves to become well-known.' *Erlend J. R. Lee, MA (Oxon), Dip. Econ. Pol. Sci. (Oxon), Dip. Archaeology (London)*

Introductory note of thanks

I am much indebted to the author of the above comment with whom I have had many challenging dialogues over the years and who read a draft of this paper very thoroughly. In a number of cases his comments provoked improvements to the text. Nonetheless there are still many areas on which we disagree and the very generous endorsement is no indicator at all as to the extent of concurrence. The final text is my responsibility entirely. *RMB*

Purpose of the paper

The original exposition of Alphomism which, for convenience, is summarised below, had few references to modern science. This was partly because of a desire to keep things as conceptual as possible such that the theory is not vulnerable to the fashions and vagaries of research outcomes.

The other reason for the paucity of scientific allusion was the comparative ignorance of the author. Modern science is daunting! Some commentators suggest that nobody really understands quantum mechanics. Indeed, there is even a suggestion that the field is so mysterious that anyone who claims to understand evidently hasn't; a thoroughly modern paradox.

Despite this, it was recognised that there was a need to match Alphomism against current scientific thinking so the plunge was taken. There was initial anxiety that the theory and modern science might be fatally incompatible but as the research continued it became excitingly clear that there is a powerful match. Far from undermining Alphomism, quantum mechanics and cosmology offer dramatic reinforcement.

Evidence in support of this claim is that the science-oriented version of Alphomism provides answers for age-old questions relating to:

- the **infinity** paradox
- the **mind/body** relationship
- the causal basis of so-called **random** events.
- **free will/determinism**
- the question of the **origin of everything**
- the problem as to how the **laws of nature** are generated and sustained
- not a few others.

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PART 1: PRELIMINARIES

1. Outline of the Argument

In *A Brief History of Time*, Professor Stephen Hawking suggests[1] that the goal of science is to produce a single theory that describes the whole universe. He says that we have two partial accounts, namely 'general relativity' and 'quantum mechanics' but that these are *'known to be inconsistent with each other.'* [2] In common with many others, Hawking proposes that a quantum theory of gravity is needed to reconcile the two approaches and thereby complete the theoretical scientific picture.

According to a newspaper report[3], Hawking later changed his mind and, based on the existence of some unsolvable mathematical paradoxes[n1], argued that a general theory of the universe is not attainable. Cambridge astronomer Sir Martin Rees is quoted in the same article as disagreeing. He said; *'In some sense there must be such a theory, but its nature and what it will imply is very controversial.'*

It is strongly argued here that it is correct that there cannot be a *scientific* account of the entire universe but the reasons given for this conclusion are very significantly different from those adduced by Hawking.

It is claimed that science will always fall short of completeness because:

1. Its essentially linear approach leads, inexorably, to the notion of ***infinity***. This is a term largely but vaguely derived from religion, which confuses greatly and explains nothing.

2. ***Consciousness*** is undeniably a part of the universal process yet of its very (objective) nature science cannot provide a satisfactory account of subjective phenomena. It is logically contended that science is incapable of providing a causal account of mental activity and in this respect it can never be all-embracing.

3. Science sets out to explain the causes of everything that happens yet it relies on randomness. It is blatantly evident that any theory which allows 'cause-less' events cannot generate a complete causal account. It might be argued that one day all events which seem to be 'random' will be explained and become predictable but there will still be the puzzle of the ultimate cause. How can science explain ***causality*** in general?

However it is held that Rees was correct to claim that a general theory *is* possible but it is maintained that any such account has to go beyond physics, that is, it has to be *metaphysical*. This will perhaps be anathema to not a few scientists but a robust defence of metaphysics is a crucial part of this essay.

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2. The Original Alphomism

For those who have not had chance to study the original account, and for those who have done so but would welcome an *aide memoir,* a very brief summary of the general Alphomist thesis is given here in a series of propositions. Many of them are contentious, but the reader is asked to keep an open mind; the supportive arguments come later.

1. The 'universe' is all that exists. It is a system of energy operating in space.

2. Other than the universe there is nothing. This does not mean empty space; it is an instruction that there is 'no thing' which needs to be imagined; there is no 'outside' whatsoever.

3. The self-contained nature of the universe entails that any account of its process must be in the form of a closed loop or cycle which must entail a self-sustaining flow of energy.

4. Energy can variously be seen as both continuous and discontinuous in format. The continuous aspect is associated with consciousness (subjectivity) and also timelessness, the discontinuous with physicality (objectivity) and also time.

5. Time is the most general expression of the operation of discontinuous energy in space.

6. Prior to the 'Big Bang', which took place approximately fourteen billion years ago, energy was so organised that there was a state of maximum consciousness with minimum physical activity. This phase is given the name 'Alpha'.

7. The energy involved in the conscious element was continuous and had no internal time. The very small physical substratum, on which the sphere of consciousness depends, generated the Big Bang.

8. The explosion destroyed the complex energy-organisation and violently began the distribution of the pieces. The universe was then in a maximally physical state.

9. At the instant of the explosion, there began a process of evolution which is called 'Nature' and which will, untold millennia hence, result in the re-forming of the Alpha state.

10. We are at a relatively early stage of Nature and our knowledge is limited. We will eventually gain total understanding and thereby, almost certainly along with others in many parts of the universe, take control of the developmental process.

11. The purpose of the evolutionary phase is twofold; The first is to generate the 'contraries' of positive/negative, light/dark and so on, without which there could be

no meaning. The second is to create conditions where free will can develop. Will power is the ultimate fuel of the universe.

12. With total knowledge at the end of the evolutionary process, our successors will design and re-create the maximally conscious, timeless phase. The point at which the universe reaches total re-integration is given the name ‘Omega’.

13. Because Alpha and Omega are identical, the name ‘Alphoma’ is appropriate for the timeless phase.

14. All elements of consciousness which participate in the evolutionary process exist also in Alphoma

15. Although the Big Bang was cataclysmic there was not total chaos thereafter. Built into the system are laws of Nature which, whilst allowing necessary freedom, nudge things generally towards the point of re-integration. As conscious beings emerge we are able to study and harness the underlying forces, a process which will continue and grow.

16. There is a second source of knowledge in that the disintegration at the Alpha point was akin to the breaking up of a vast jigsaw puzzle. Each fragment of energy contains an element of the picture. Through introspection and ‘putting things together’, conscious beings can grasp elements of the total.

17. Information gained by studying the laws of Nature is guaranteed by those laws, information derived from introspection is less secure. It is suggested, however, that any idea which has been accepted by many people and which has persisted for a long period of time is probably an approximate view of part of the universal picture. Thus ideas of a supreme being, resurrection, paradise and so forth, though in Alphomist terms misrepresentations, derive their enduring potency from the allegedly true picture of a timeless, paradisiacal state, a disintegration and an eventual re-creation.

18. However, Alphomism holds that there is no deity; we are the designers and ultimate controllers. There is no direct communication between our Alphoma selves and our Nature personae.

19. The fact that there is existence is a total guarantor that overall the process of the universe works. Nonetheless there is no certainty that the particular manifestation of consciousness on planet Earth will survive.

20. However, Alphomism holds that all energy which is involved in an organised entity is permanently changed by having been organised. The universe can be seen as a giant workshop, the purpose of which is to spin the straw of disorganised energy into self-conscious gold or, to use another potent folk analogy, to reassemble Humpty-Dumpty. No creative effort is ever wasted, for even when something is destroyed, say

by war or vandalism, the re-distributed energy is of a higher status than the most disorganised, post-big-bang version and thereby more readily usable.

PART TWO

THE SCIENTIFIC STATE OF PLAY

Chapter 1: The Context

1. Classical Science

Towards the end of the nineteenth century, science was in a robust state. Newton's laws were unchallengeable, there were well-established equations to describe the expansion of metal, the behaviour of gases and most other aspects of the physical world. Maxwell had figured out electro-magnetism. Even the development of mankind was largely seen, thanks to Darwin's theory of evolution, as a determined progression.

Indeed, confidence was so high that there were some who suggested that scientists had almost completed their task of making sense of existence. The magnificent achievements of the engineers; the bridges and tunnels, the vast factories with their puffing, clanking machines, the cathedral-like railway stations, all bore testimony to the reliability of the natural world and the certainty of its processes. Everything, it seemed, was solid, determined and controllable.

The certainty about the rules relating to Earthly phenomena made it natural to transfer the assurance to the cosmos. The planets of our solar system behaved in a very regular fashion; it was most reasonable to assume that the entire universe was satisfyingly ordered in much the same way as a tramway system.

2. The Modern Revolution

1. The Macro

Arguably it was the nature of light which posed the greatest challenge to a rigid model of the universe. It would have been highly convenient had light behaved either as a wave or a stream of particles. Alas it seemed to be both at once. It was even sardonically suggested that the wave theory should apply for three days per week, particle theory for another three with Sunday off.

Then, in the last decade of the nineteenth century, it was light which once again led the way. Michelson and Morley, in an attempt to test for the existence of a space-filling ether, made a discovery about the speed of light which existing physics could not encompass. It took the lateral thinking of Einstein to express a newly realised truth; that

the speed of light remains constant no matter how fast, nor in what direction, the measurer of its velocity is moving.

(It is worth noting that the speed of light varies as it passes through media; for example, glass. The oft quoted maximum velocity applies only to light travelling through a vacuum and later it will be suggested that there are no perfect vacuums. Nonetheless, in any given medium, the speed of light is independent of the movement of the measurer).

A simple way to imagine this is, firstly, to think of two parallel conveyor belts running in a very long, utterly featureless corridor. You are sitting on one of the belts but the ride is so smooth, and the visual cues so scant, that you think you are stationary. The belt beside you has markings every few meters and you can see that it is going by. You measure its speed, record the value and then doze for a while. Whilst you are asleep, your belt slows down very considerably and when you wake up it seems as though the other belt is going very much faster. Again, you measure and record the velocity. The reading is indeed higher and you are sure that the other belt has accelerated. Relative to you, of course, it has but in 'real' terms it has not. It is not expending more energy, it is your belt which is expending less.

Now suppose that instead of another belt beside you as you travel the featureless corridor (but still feeling to be completely still) there is a beam of light which fills the space. Whatever speed you are travelling along the corridor, and even if during one of your dozes you have gone into reverse, the speed of the photons which make up the beam of light will measure the same regardless of the direction of shine. From the beam you can gain no clue as to how fast you might be travelling; you can do this only relative to the walls of the tunnel or your starting point on the conveyor, both of which, in this mental experiment, are denied to you as reference points.

It seems paradoxical that the discovery of an *absolute* constant, that is, the speed of light, should generate a theory that everything is *relative* but, as with not a few aspects of modern science, there is a terminological confusion. This is exemplified in Rosenblum and Kuttner's generally excellent book *Quantum Enigma*. They write[4]: *'Any observers, whatever their constant velocity, could consider themselves at rest. There is no absolute velocity; only relative velocities are meaningful….'*

There is a suggestion[n2] that the maximum speed of light has varied but it is generally held that at any one time it is constant. So in this sense there *is* an absolute velocity and this is all that matters from a relativity point of view, a suggestion which can be backed by the following argument.

As far as we know, everything in the universe is moving. All the indications are that there is no fixed point, no centre. We are therefore free to consider any point in the universe as our datum and fix locations from there. However, if it had been the case that the speed of light varied according to direction we could have used this to build a grid. Light from stars all over the universe would have a directional 'signature' but in fact it does not.

It is, perhaps, therefore more accurate to say that there is no absolute *direction* rather than that there is an absolute velocity. This means that although we have an absolute constant at any one time, we are left only with relativity when it comes to mapping the universe.

A watery analogy might make this clearer. Imagine a planet which is predominantly made of liquid. On the surface are floating conurbations which move very slowly. The shape of the planet also changes, so there is no identifiable centre. In such a world, any of the islands could be taken as the datum for measurement. It wouldn't actually be fixed but it could seem so. (This, of course, is not far from the reality here on Earth. The land masses slowly drift yet mostly we think of them as being stationary).

That the universe is akin to such a transient, liquid environment must have been a shocking revelation for the scientific establishment in the early years of the twentieth century. As suggested above, most would surely have had a mental image of the universe as a vast and complex clockwork-like mechanism, settled on unshakeable foundations. In its place they were being asked to create a picture of a slow cosmic dance where nothing whatsoever is fixed.

As the decades passed, the picture of the universe changed ever more radically. For a long while there was a passionate debate as to whether there had been a 'Big Bang', a massive explosion of all the universal energy, or whether there is a steady state of continuous creation.

These days, few question the contention that approximately 14 billion years ago there was a 'primal atom' which exploded and created a mind-scrambling array of heavenly phenomena. The aftermath of a gargantuan explosion is, of course, very far removed indeed from the clockwork conception.

The indeterminacy is reinforced by the fact of expansion. Hawking[5] tells us that measurements of the Doppler shift[n3] show that the universe is expanding at a rate of something between 5% and 10% every thousand million years.

But about the future of this expansion there is uncertainty. Hawking[6] cites the 'Freidmann models' which suggest that there three possible outcomes, namely that the universe will:

- continue to expand for a time and then contract
- expand 'for ever' at a steady rate
- expand at a decreasing rate (but never reach zero expansion)

It is assumed that any contraction of the universe would have to come about via the agency of gravity. For this to happen there would have to be a critical mass on which gravity could operate. Hawking[7] notes that the total of known mass is less than 100^{th} of amount needed to bring contraction but says that there *'must be dark matter'*. He cautions, though, that even if this is added then the universe would still have only one tenth of the total mass requisite for it to contract. He allows that *'there could be other*

matter' yet still comes to the conclusion that on present evidence the universe will probably expand 'for ever'.

For a classically-minded scientist, the idea of an expanding universe brings up further difficulties. Is it the material aspect which is expanding into emptiness or rather that space itself expands?

There have been further cosmological developments which challenge orthodoxy. In a newspaper article[8] Paul Davies expresses the puzzle thus:

'Cosmologists have long been perplexed by the fact that the laws of nature seem to be so cunningly concocted to enable life to emerge.... It turns out that the whole chain of events is a damned close run thing. If the force that holds atomic nuclei together were just a tiny bit stronger or a tiny bit weaker…life may never have happened.'

Davies strengthens the case with a quotation from Fred Hoyle to the effect that the universe is a '*put up job'*.

How can a person with a mechanistic turn of thought begin to deal with this without resorting to unscientific mysticism? In fact, the need to account for what some call 'The Goldilocks Enigma' has led to all manner of theories, some of which will be explored later.

Yet although there is a case for viewing the universe as a product of careful design there are intimations that it is potentially a self-destructive entity. The possibility of endless expansion and a relentless running down of energy has already been mentioned but the twentieth century also saw the discovery of 'black holes' – vast entities which suck in any energy within their gravitational range and which, it was originally thought, never let it emerge. However the main progenitor of the black hole idea has had second thoughts

A newspaper leader[9] reveals that: *'Hawking is said to be ready to admit that a black hole does not absorb and destroy the matter it absorbs. Instead the matter's "information" eventually returns…'* The leader-writer goes on to say that the claim about the destruction of information was always controversial, and indeed, according to quantum theory, impossible.

Whatever stance a modern scientist takes on these various issues it is abundantly obvious that no clockwork model can begin to represent the universe. It is a thing of fluidity and immense power-transfers. It is a place where relativity seems to rule.

2. The Micro

In the face of these macroscopic shocks to the old system, a nineteenth century scientist might have hoped for more solid footings in the micro world. From Democritus in ancient Greece onwards there had been the notion that the material world was made up of tiny particles. Dalton's atomic theory was well-established. Hawking tells us[10] that;

'Everything in the universe, including light and gravity, can be described in terms of particles.' Surely the tiny planetary systems, which are the preferred models of atomic structure, are made up of entities which are comfortingly solid?

Alas for the traditionalist, not so. During the twentieth century it irresistibly emerged that the particles are, in fact, not solid pellets but packets of energy. Einstein's wonderfully simple formula, $e = mc^2$, describes the relationship between the mass of an object (m) and the energy it contains (e). The fact that the speed of light (c) is a very large entity tells us that even the tiniest fragments of mass have huge potential. A glass of water can theoretically be transformed into a cataclysmic bomb. The universe is potentially explosive. The classical ideas of solidity and dependability have even less chance of surviving when high energy is so pervasive.

Even more disturbing perhaps is the fact that we ourselves are, at root, insubstantial beings. Oxford University professor of physics, Frank Close, writes[11] that: *'We are made of atoms so small that a million could fit into the width of a single human hair'* and adds the even more mind-testing notion that atoms are made of minuscule bits, most of which exist for only a billionth of a second.

But there was a further major blow for the traditionalists in the guise of a difficulty which Heisenberg expressed in his 'Uncertainty Principle'. This asserts that it is impossible to specify accurately both the position and velocity of an observed particle. One can be done but not both simultaneously; we are stuck with systematic uncertainty.

Hawking[12] explains the difficulty in terms of measurement. He says that the incident light needed to observe a particle has to be of a short wavelength and continues: *'…one cannot use an arbitrarily small amount of light one has to use at least one quantum. This quantum will disturb the particle and change its velocity in a way that cannot be predicted.'*

Some roundly reject this 'measurement-based' explanation of uncertainty. Daniel F Styer lists it among the 'common misconceptions'. He writes[13] *'This is a particularly common misconception because some arguments due to Heisenberg ("the gamma ray microscope") and Bohr can be interpreted to support it. It is another attractive idea rendered untenable through tests of Bell's theorem.'*

Whether the provenance of uncertainty is due purely to problems of measurement or something more fundamental (a topic which will be further explored later) it seems certain that the fact of indeterminacy is very widely accepted. Hawking[14] says that in place of the old certainties relating to large bodies such as billiard balls we are left with only a 'quantum state' which is depicted by a combination of position and velocity which gives us no absolute precision but which allows us to list a number of possible outcomes and assign probabilities to them.

And as if this uncertainty were not enough, it emerged that the constituent particles of matter have some very peculiar habits indeed.

Rosenblum and Kuttner[15] describe how a sub-atomic entity can manifest itself as either a packet of waves or as a particle. In waveform, it can be split by a half-mirrored piece of glass set at an angle. Half of the energy travels straight on, the other half is reflected in a different direction.

These two packets can be caught in boxes. Subsequently, if the boxes are opened *simultaneously* the two semi-waves carry on as waves. (This can be demonstrated because when waves come together they 'interfere' and create distinctive patterns which can be shown on a screen[n4]). However if only one box is opened, it either contains the entire entity or nothing. If there is nothing, then the entity is in the other box. It's a quantum conjuring trick. Scientists refer to this oddity, where a particle can seem to be in two places at once, as a 'superposition state'.

A similar phenomenon applies to atomic nuclei which are effectively mini-magnets. Under some circumstance they can seem to have their north poles both up and down at the same time.

'Nobody understands quantum mechanics' says Richard Feynman[16]. In view of such general incomprehension it might be tempting just to abandon this particular scientific ship but there seems to be a broad consensus that it is the most successful scientific theory of them all. What are now everyday objects; microwave ovens, disc players, mobile telephones and others, all became possible through implementing ideas which arose from quantum mechanics. Obviously, it cannot just be ignored.

The critical question concerning the 'separation state' experiment when only one box is opened is this: What determines which box the atom will be in? Some say that it's just a matter of probability (whatever that means) but others claim that the *act of observing* is instrumental. There is, in other words, an objective/subjective split in interpretation. Rosenblum and Kuttner quote[17] Pascual Jordan, 'one of the founders of quantum theory' as writing; *'…observations not only **disturb** what is to be measured, they **produce** it.'*

Rosenblum and Kuttner[18] also tell us that; '*According to quantum mechanics there was not an actual atom in one of the boxes before someone looked.'* It is not, however, suggested that there would be differing outcomes with different observers. We are told that[19] *'If someone happened to see the atom at a particular spot, that look would collapse the spread out wave function to be concentrated at that particular spot for everyone. Any subsequent looker would find the atom there – as long as they looked before it moved away.'* So, the subjective approach embodies a degree of objectivity but even this is odd. The quantum story still seems to contain elements of magic.

New Scientist writer, Zeeya Merali[20], asserts that: *'Quantum mechanics is widely accepted by physicists but is full of apparent paradoxes which made Einstein deeply uncomfortable and have never been resolved.'* In the same article, Nobel prize winner Gerard 't Hooft of Utrecht University is quoted as saying that *'Quantum mechanics*

works wonderfully well but it is not complete' suggesting that the mystery will one day be solved by scientists.

Famously, Einstein gave these 'apparent paradoxes' the catchy name of *'spooky interactions'*. Amit Goswami[21] provides a very succinct list of them, though he more properly chooses to label them as 'quantum properties'. They are:

1. *A quantum object (eg electron) can be in more than one place at the same time (the wave property)*

2. *A quantum object cannot be said to manifest in ordinary spacetime reality unless we observe it as a particle (collapse of the wave)*

3. *A quantum object ceases to exist here and simultaneously appears in existence over there; we cannot say it went through the intervening space (the quantum jump)*

4. *A manifestation of one quantum object, caused by our observation, simultaneously influences its correlated twin object – no matter how far apart they are (quantum action-at-a-distance)*

Goswami has stated these very clearly but it worth repeating them in different words just to emphasise the oddity of the inner workings of Nature. It seems to be the case with microscopic entities that:

1. They can seem to be in two places at once.
2. In some sense they seem not to exist until they are observed.
3. They can move instantly from one place to another.
4. Two entities which have come from the same source somehow 'know' what the other is doing no matter how far apart they have become.

All of these properties are anathema to a traditional scientist. The first defies simple logic, the second suggests that consciousness plays a part and that therefore objectivity has to be breached. The third 'property' contravenes the belief that nothing can travel faster than light whilst the fourth is perhaps the spookiest of all the interactions, for how can information be shared across great divides without some evident means of communication?

There would seem to be two broad stances in the light of the experimental data. One is to dig in, to defend scientific orthodoxy, indeed to go to any lengths to retain absolute objectivity. The alternative is to open the mind to other models involving fresh possibilities.

Some highly respected scientists have chosen the latter route and perhaps the most controversial shift is to allow that maybe there is no alternative to the inclusion of conscious factors.

Rosenblum and Kutner[22] write:

'*That physics has encountered consciousness cannot be denied'*.

On the same page they also quote another Nobel prize winner, Eugene Wigner, who advanced the view that:

'It (is) not possible to formulate the laws of quantum mechanics in a fully consistent way without reference to consciousness.'

Amit Goswami[23] agrees:

'*In order to understand the behaviour of quantum objects, however, we seem to need to inject consciousness*.'

In accord with this stance, 'quantum theorist' Freeman Dyson is quoted[24] as writing: *'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 consciousness.'*

Rosenblum and Kuttner[25] embrace the role of consciousness fully. They consider at length the notion that particles can sometimes appear in a distributed way as a waveform and sometimes as a concentrated unit. Of the link between the two versions they write:

*'The waviness in a region is the probability of **finding** the object in that region. Be careful – the waviness is not the probability of the object **being** there. There's a crucial difference! The object was not there before you found it there. Your happening to find it there **caused** it to be there. This is tricky and the essence of the quantum enigma.'*

It is not just direct human perception which is effective. Rosenblum and Kuttner tell us[26] that an Alpha particle emitted from a nucleus might have waviness extending over kilometres but as soon as a Geiger counter detects the particle all of it is inside the counter.

So, to match the Goldilocks Enigma on the macro scale there is the Quantum Enigma on the micro scale. Both strongly imply a role for consciousness. It seems at least possible that there is a crucial element of design in the workings of the universe and also that there is, at the micro level, no absolute objective reality. There is only probability until an observer comes into the scene[n5].

The Quantum Enigma writers acknowledge[27] that many scientists feel that consciousness is too ill-defined to be part of science and they go on to say that most scientists *'give the quantum enigma little thought.'* They note Einstein's view, shared by others, that the theory of quantum mechanics has to invoke the role of consciousness only because it is incomplete.[28] Huge amounts of time and intellectual energy have thus far been devoted to

the task of 'completion' and there is as yet no resolution. In the ensuing section a very brief account is given of some of the avenues which have been explored.

3. Strings and Multi-things

Science, as the ultimate bastion of objectivity, cannot cite gods as solutions to problems. In his newspaper article[8] about the apparent design in the universe Paul Davies says: *'Since this sounds a bit too much like divine providence, cosmologists have been scrambling to find a scientific answer to the conundrum of cosmic bio-friendliness'.*

The 'scramble' has led to the suggestion, initially scorned but now quite widely countenanced, that there is not just one universe but very many. It is argued that if there are millions of universes, all fizzing and firing, then it is likely that at least one of them will be suitable for the development of life, an approach which would seem to have statistical respectability if no other.

Abraham Varghese in his book 'The Wonder of the World'[29] writes: *''Astronomers like Martin Rees have speculated that the apparent fine-tuning in the universe exists because at least one of the infinitely many universes will have the particular constants and conditions that made life possible.'*

Davies[8] outlines a development of Rees's theory which suggests that we could even be part of some super-cosmic matrix. He quotes Rees's view that *'We may be a simulation…creations of some supreme, or super-being.'*

However, there are many problems with the multiverse proposal. In the Varghese book referred to above, Martin Rees, despite his promulgation of the theory, is said to hold that; *'…the scientific case for a multitude of universes lies on the speculative fringe of cosmology; the idea is built on guesses not laws or evidence.'*

Further, Paul Davies asserts[30] that *'many scientists hate the multiverse idea'*. He suggests that the hypothesis is not amenable to scientific testing but then speculates that there might be indirect ways of validating the notion. Perhaps indicating a degree of desperation, Davies cites the discovery that six billion years ago there was a minute shift in the speed of light[n2]. Davies asks: *'Could this be the simulators taking their eye off the ball?'*

But way before questions of hypothetical master-minds can be addressed there is one more fundamental matter to settle which is; if these 'other universes' exist, where are they?

A favourite response, despite Stephen Hawking's assertion[31] that *'It is impossible to imagine a four-dimensional space,'* is that they lurk within hidden dimensions.

In an attempt to elucidate, Davies[32] tells us that: '*A fourth (spatial) dimension would allow a **fourth** direction, lying perpendicular to the other three'* but he allows[33] that it is

bewildering to attempt to imagine more than three dimensions. He concedes that: '*Clearly you cannot have that in familiar space but one can study a fictional space with such a property.'* He contends that; *'…the mere fact that we find something hard to visualise is no argument against its being correct.'* [n6]

There are other attempts to conceptualise additional dimensions. One makes use of the idea of a hose which, from a distance, looks like a line. We know, however, that any point on that 'line' is part of a (sectional) circle. It is suggested that what we believe to be points in familiar space are in fact tiny circles around a fourth spatial dimension. The prognosticated circles are, of course, potentially visible only via micro-physics.

Another approach is to conjure up a 'flatland' world where the inhabitants live on a two dimensional surface, unaware that there could be an above and a below. Davies writes[34] about the possibility that we humans are in a world where light is so organised that we cannot see the fourth dimension. It is conceded that: *'As yet…there is no experimental evidence... just a lot of intriguing mathematical theory.'*

There is a popular analogy which asks us to imagine that we are fish in a pond, swimming about and minding our own business. One of us is lifted out and all at once we can see the larger world. When we are returned to the pond and report to our companions they think we are demented.

It is extrapolated from this that one of us might one day be (some claim that many have been) lifted into another dimension. But the reality is that the fish would not be in a different dimension, just a continuation of the familiar ones. Indeed the fish, whilst skimming the surface or leaping out of the water, might already know of the supposedly alien world. And if we are to be plucked, who would pluck, and where would they be based? If fish keep a wary watch they can see the potential pluckers.

The difficulties of conception and the lack of experimental evidence do not deter the writers of headlines. One online example, quoted[35] by Jim Al-Khalili, University of Surrey professor of physics and of the public engagement in science, boldly proclaimed that: *'Parallel universes really do exist'* although going on to qualify the claim with: '… *according to a mathematical discovery by Oxford scientists.'*

Al-Khalili acknowledges the need to explain why the universe seems to be, improbably, 'just right' for the development of life but is not positive about the multiverse approach. He writes: *'While this is a very attractive idea I find it rather lazy. In fact I would argue that it is no more satisfying than creationism.'*

Al-Khalili refers to the Oxford physicist David Deutsch *'one of the founding fathers of the exciting field of quantum computing'* who propounds the idea that all possible universes already exist within a quantum universe. Al-Khalili summarises the thesis in these words: *'What we perceive as our reality is just a weaving through this vast shadowy multiple reality, creating our own version of events,'* and goes on to comment that: *'While supporters of the multiverse interpretation argue that it is the most sensible*

explanation, the majority of physicists are sceptical, mainly since it is essentially unprovable.'

Turning to the dramatic headline, which suggested that the multiverse idea had been substantiated, Al-Khalili comments: *'It turns out that there is no proof that the multiverse exists, but rather that one of the main objections to it has been removed by an argument in logic and algebra....for now, let's take parallel universes with a pinch of salt.'*

Some aspects of the Khalili piece were subsequently disputed by the researchers. In a letter to the newspaper[36] he responds:

'*While I stand by my view that no such proof exists yet, my statement that theirs was nothing more than "an argument in logic and algebra that has yet to appear in any peer-reviewed scientific journal" neglected the history of this work. While their paper has yet to appear in print, it was nevertheless a culmination of research from Oxford and elsewhere over the past few years that indicated that the notion of parallel universes cannot be ruled out.'*

Khalili's underlying scepticism is shared by Varghese[29]. It is acknowledged that he writes from a theological perspective but there seems to be no scientific riposte to his claim that: *'There is one thing all multiverse theories share in common: there's no physical/empirical evidence available to prove them. Neither are there any established laws of physics that indicate their existence. It's a purely speculative play.'*

Varghese quotes James Trefil, Robinson Professor of Physics at George Mason University, to the effect that parallel universe ideas go in and out of fashion because theorists are '*trying to adjust a theory to produce the right mass density for the universe, for example, or the right proportion of dark matter…*'. The parallel universe aspect is, he claims, usually *'an afterthought'*.

Varghese comments: *'The common thread in all the theories we have surveyed is a tendency to substitute physical facts with metaphysical conjectures.'*

However, in the Al-Khalili article[35] it is acknowledged that the notion of extra dimensions is attractive not only to the 'why does there seem to be design?' theorists but also to those who are trying to explain the peculiar 'quantum properties' as listed by Goswami[21]. Al-Khalili concedes that; *'It is difficult to translate what is essentially advanced mathematics into words that make sense.'* but goes on to claim that the 'spooky' behaviour of particles can be explained by the device of extra dimensions.

The extra-dimensional approach to the problems of modern science stems to some extent from an approach called 'string theory' which attempts the much sought-after reconciliation between quantum mechanics and relativity.

In fact there are several versions of string theory but essentially it holds that the most fundamental components of things are neither waves nor particles (nor the peculiar

hybrids which quantum theory holds so dear) but ephemeral 'strings' which vibrate in different ways and, in a manner of speaking, 'sing' different notes. Strings are currently beyond our powers of perception and some think they ever more shall be so. However the claim is that differing vibrations of the strings produce the various particles. Given the massive appeal of music to most people the 'singing' concept is not unattractive. There are, however, drawbacks.

In the earlier forms of the theory its mathematics demanded a total of twenty six dimensions. The development of a 'superstring theory' reduced the total of requisite dimensions to ten but there is still the question as to where these extra aspects of the universe are.

Early in 2004, Peter Coles reviewed[37] a book, about the fabric of the cosmos, by Brian Green. Drawing on the text, Coles explains the latest twists in the string-theory story and outlines a version called 'M-Theory'. In some interpretations the 'M' is said to stand for 'membrane' but there are other interpretations of which one is 'mother' which suggests that it is seen by some as the ultimate begetter. However, Coles comments that there are still some acute problems relating to the extra dimensions. He writes:

'Something has to be done with the spares. These could be wrapped up so small we can't see them. Alternatively we could live in, say, a 10-dimensional universe but be confined to a four-dimensional slice of it called a brane.' This term 'brane' is derived from 'membrane'.

Coles goes swiftly on to express doubts. He writes: *'Either way it seems a bit contrived. Every time I think about these superfluous dimensions I have a vision of Occam angrily sharpening his razor.*[n7] Coles continues: *'Another problem with M-theory is that there isn't a shred of experimental evidence for it. This is why I completely disagree with Greene's assertion that M-theory reveals the "true texture of reality".....How can something be "true" and "real" if it can't be tested?'*

In this, as in many other aspects of modern science, it is tempting to conclude that mathematics is leading people by the nose. It is as though the clever calculators are asking us to believe that because we can subtract three real people from ten and leave seven, we can then take away three from nothing and leave minus three 'real' people; but of course nobody would spend any time looking for minus three people.

On this note, Varghese writes[29]: *'The great astrophysicist Robert Jastrow, an experimentalist of the highest order, once said that theoretical physicists sometimes let their mathematics run wild while anchoring it to very little in the way of observation.'* He also quotes Saul Permutter's views about theorists being all too ready to follow fashion.

Yet there are plenty of people who are not afraid to acknowledge the difficulties associated with a multi-dimensional stance who remain as signed-up M-Theory devotees.

In a New York Times article[38] George Johnson refers to strings as '*..these barely imaginable objects, God's Tinkertoys'*.

Johnson quotes Harvard physicist Dr. Andrew Strominger. *'We were once considered semi-crackpots working on some bizarre idea. While that still may be true, at least we're no longer perceived that way.'*

The article tells of a '*new development'* by Harvard's Dr. Juan Maldacena which is said to have indicated *'..a deep, hidden connection between quantum field theory and string theory..'*

Johnson claims that Maldacena's work supports a *'hot new theory'*; that the universe is holographic He explains: *'In a holographic universe, the information about everything in a volume of space would be displayed somehow on its surface. The bizarre implications of this notion are only beginning to unfold.'*

The writer adds; *'Maldacena concedes that his conjecture is burdened with the criticism that applies to all of M-Theory; that it cannot yet be tested by experiment.'* and admits: '*Some physicists still maintain that for all the conceptual revolutions in string theory, there is little to show but a lot of beautiful mathematics.'*

This point of view is reinforced by a quotation from Nobel prize winner Dr. 't Hooft which runs; "*No observable physical phenomena have been explained, so it is tempting to be sarcastic about these developments.'*

Johnson admits that *'even M theory's enthusiasts are baffled by what it all really means.'* He offers a quotation from Dr. Steven Giddings, a theorist at the University of California at Santa Barbara:

'Before the second superstring revolution, life was simple. We believed that everything in the universe, quarks, photons, gravitons, electrons, and the rest, were all made out of strings. The recent upheaval has shattered that view, and we've yet to find a convincing logical structure to replace it."

Giddings continues: *'Perhaps they're all made from something even more fundamental. It's like climbing a mountain to reach the top and discovering that it's just a foothill to a more distant range. We've made an enormous amount of progress in the past few years, but now realize the greater depth of our ignorance.'*

And the passage of recent time has not produced greater consensus. Writing in 2006 Robin McKie quotes[39] Robert Laughlin, 1998 Noble prize winner for physics, as saying: *'Far from a wonderful technological hope for a greater tomorrow, string theory is the tragic consequence of an obsolete belief system.'*

Another comment in the article comes from Columbia University's Peter Woit: *'Too many people have been overselling very speculative ideas. String theory has produced nothing.'*

McKie also cites Lee Smolin, of the Perimeter Institute in Canada, who compared the focus on string theory to a false trail to find a cure for cancer. Smolin goes on to suggest that twenty years of effort have been wasted and that part of the problem is that scientists who were encouraged to take up the exciting new ideas of string theory in the 1980s have become stuck with it. McKie even goes so far as to suggest that: *'It is the scientific equivalent of the emperor's new clothes.'*

However, not everyone is so sceptical. David Gross of the University of California Santa Barbara, also quoted by McKie, holds the view that the development of string theory is a long process and expresses the hope that new particle accelerator at CERN[n8] will provide evidence Cambridge University's Michael Green goes way further in his quoted belief that: *'There is no alternative to string theory. It is the only show in town – and the universe'.*

There are, of course, a million more words that could be written about the attempts of scientists to deal with the universe's apparent paradoxes and enigmas. All that was intended here was to give an indication. There will be further consideration of modern ideas in subsequent chapters.

4. Overview

Faced with the staggering collapse of nineteenth century certainty, science has battled on. Despite the huge creativity of the theorists and the genius of the mathematicians the universe still holds many deep mysteries. It might be thought that Hawking's first opinion is right and that a quantum theory of gravity, with or without strings, multi-verses and multi-dimensions, will provide us with the comprehensive picture which we seek.

It is here predicted that this will not transpire. It will be argued that the problem is not computational but conceptual. As the economist J. M. Keynes said of his general theory, the difficulty lies not so much in the new ideas but in ridding ourselves of the old.

Chapter 2: Three Problems

Oddly, for a discipline which has been known to scorn blind faith, science has its trinity of mysteries which come into play whenever it seems that the limits to explanation have been reached. They were outlined in the earlier summary but are re-presented here for ease of reference. The unholy articles of faith are:

- Firstly, that the word 'infinity' and its mysterious derivatives have meaning.

- Secondly, in defiance of the immediacy and undeniable nature of mental activity, that objectivity is everything. The subjective aspect is judged to have little relevance and many think it will eventually be explained away.

- Thirdly, that words such as 'random' and 'singularity' can excuse us from the task of finding causal accounts for all aspects of the universe.

The difficulties which these dogmas entail are discussed immediately below. The Alphomist solutions to the problems appear later.

1. The 'Space' Problem: Infinity

One apparently simple way of trying to get a grasp on the concept of 'infinity' is to imagine a photon being projected from a light source and travelling through totally empty space in a straight line. Once it is moving it needs, under the circumstances as specified, no further source of energy to keep going. It would travel 'for ever'.

There are massive practical problems. Firstly, as will be discussed later, it seems that there is no such thing as 'empty space', so the chances of the photon escaping a collision are vanishingly small. (Paradoxically, if the concept of 'infinity' is accepted then it might be argued that there is *no* chance of such an impact-free passage. On the other hand it could be confusingly proposed that one of the infinite number of outcomes would be a collision-free passage!)

The second practical consideration is that it seems highly likely that gravity, and perhaps other forces, would bend the path of the photon so that it isn't going 'straight' (whatever that means in this context) but curving in a circle, a spiral, (probably a death spiral!) or some such enclosing shape.

But still, for the sake of the exposition, let us suppose that the particle travels and travels and travels….It keeps on travelling and perhaps all that can be said is that the *state of unending-ness* represents the scientific notion of infinity.

Crucially, though, it is here suggested that the endemic problems arise because scientists have transmuted 'infinity' from a process, that is, a verb-related word, to a quality and a thing, that is, both an adjective and a noun. 'An infinite number' implies a type of number. 'At infinity' implies a place.

But for words to have noun-references they have to be 'cashable' We apply them as labels for objects, forces, feelings and so forth which we can 'point' to in a variety of ways. Of course words can be combined to create descriptions of objects which don't exist – a jabberwocky for example. We can have images in our minds of imaginary entities but we don't grant them 'reality' until we can point to at least one example.

The supposed 'thing' known as 'infinity', being totally inaccessible from the pointing point of view, might be thought of as an imaginary entity but there is one devastating way in which it is different from items such as a jabberwocky.

This is that; *the definition of the word contains the negation of any chance that it might be 'cashed'*. Anyone claiming to be pointing to an example of infinity must instantly be disabused. If it's containable, in any way whatsoever, it's not infinite.

So, 'infinity' the noun refers to nothing real nor even to something potentially realisable. It is oxymoronic. It is saying: 'If you can see me then it's not me you are seeing'.

The further difficulty is the practical corollary of the conceptual one.

Suppose a scientist says 'The universe is infinite' and we, very reasonably, ask for proof of this. What could be done?

Allowing the solving of the problem as to what counts as 'straight' in the universe, the complexities caused by movement of the Earth and the trickiness of communication, a very fast probe might be sent out and our loyal offspring might, generation after generation, listen to reassuring beeps for zillions of years. Maybe the probe would, despite our best efforts at straightness, behave like someone setting out on the surface of the Earth and eventually come back to its starting place. If it did so, it would not have been proved that the universe is infinite. But if the probe kept on travelling and travelling and travelling, at what point would our successors, finally getting bored, conclude that the universe is infinite?

They would, alas, have to stick to the (forlorn) monitoring task, for there would continue to be the possibility that a boundary to space might be found.

There is, in short, a fatal flaw with the supposed experiment. If a boundary is found, infinity has not been proved whereas if a boundary is not found then the search has to continue until, one supposes, infinity.

We can neither conceptualise 'infinity' nor prove it; no wonder it leads to problems.

The inherent confusion about the term emerges quite early on in Hawking's book[40]. He claims that the universe is not infinite in space but then says that '*space has no boundary*'. Does this mean, perhaps, that it is the matter in the universe which is 'not infinite' but that space is?

It might be argued that the scientific notion of infinity (as contrasted with mystical and theological ones which involve incomprehensible leaps of faith concerning omniscience, omni-presence and so forth) can be defended on the grounds of longevity. Surely it has been in mankind's intellectual armoury more or less throughout history and thus deserves reverence. But in fact, according to early twentieth academic John Nichol, this is not so. He asserts that infinity is a relatively recent invention as far as science is concerned.

Writing about Francis Bacon, one of the reputed 'fathers'[n9] of modern scientific method, Nichol says[41]:

'The notion of infinity in the modern sense – ie as distinct from the indefinite – is no more present to his mind than it was to that of the Greeks.'

Bacon's seminal works were being produced in the early seventeenth century and, though he professed a belief in a limitless deity, he very evidently thought of Nature as being finite. At some point 'infinity' became acceptable as a noun. Perhaps it achieved its new status as religious faith declined, but it leads to some odd consequences.

Some say, for example, that parallel lines meet 'at infinity'. What does this mean? Does the meeting happen in an instant or gradually? If the latter, they cease to be parallel as soon as one or both begin to converge so either the process starts before 'infinity' or 'infinity' has a territory of its own. If there is such a territory, is it part of infinity? If the line-meeting is an instant one, where in the universe does it happen? What do parallel lines which have met look like? They are probably just one line but the coming together is at infinity so there's nowhere further for the united line to go. Perhaps it would be preferable to claim that parallel lines *cease to exist* at infinity which could perhaps be seen as a peculiar kind of meeting.

There's another tricky matter.

Sometimes people write of 'an infinite number' of things but presumably if there were an infinite number of one particular thing there would be no room for anything else.

A very long time ago Aristotle rhetorically asked[42]: *'How can one conceive of an actually infinite series?'* He also averred that: *'Nothing actually infinite can exist'*. This supports Nichol's view, quoted above, that there was an ancient Greek scepticism about infinity.

Writing from a mystical perspective in the twentieth century, F. C. Happold expressed the view[43] that it is impossible to conceptualise infinity. He wrote: *'…to understand infinity is to comprehend the incomprehensible'*.

Mystics delight in paradoxes but scientists need to resolve them. It is, therefore, altogether odd that, despite the fact that the problems with 'infinity' are evident, the term continues to be used liberally by scientists.

Hawking tells us[44] that the primal atom existed 10-20 thousand million years ago when *'the density of the universe was infinite.'* In relation to the pre big-bang singularity Paul Davies affirms[45] that: *'As space is compressed to zero volume, the density of matter becomes infinite.'* The agreement is unsurprising in that the Theory of Relativity entails an infinitely dense 'primal atom'.

What (dare one say 'on earth'?) could this mean? *Infinite density*; perhaps an extremely impervious rock?

Much further into his book about time, Hawking describes[46] the pre Big Bang universe as *'infinitely hot'*. Here is another mental challenge. How rapidly are particles moving at infinite heat? Presumably they are vibrating at infinite speed, in defiance of the theory of relativity. Hawking lists a number of puzzles about the post Big Bang process and tells us[47] that the general theory of relativity cannot provide answers *' ..because of its prediction that the universe started with infinite density.'*

Like many another scientist, Hawking seems to have a thoroughly ambivalent attitude towards limitlessness. It appears sometimes that he accepts the notion but at other times he expresses doubts. For example, writing of Newton's proposition that there is an infinite number of stars, he suggests[48] that *'This is an instance of the pitfalls you can encounter in talking about infinity*'. Much later on he discusses the theory that there might be an infinite number of universes but then, sensibly, asks the question as to the point of speculating about something that we can never perceive.

Hawking writes also[49] about a process called *'renormalisation'* which involves cancelling out *'absurd infinities'* by introducing other infinities, a process which, he avers, is *'rather dubious mathematically'* .

In fact the entire basis of the use of infinite entities in mathematics is said by some to be unreliable. Paul Davies advises us[50] that: *'When a physical theory contains an infinite quantity, the equations break down and we cannot continue to apply the theory.'*

Much more damaging, given that much of modern cosmological theory is based on mathematics, is Hawking's suggestion[51] that the general theory of relativity breaks down, and thereby leads to the idea that the universe originated in a 'singularity', *'..because mathematics cannot really handle infinite numbers..'*. (It is perhaps reasonable to ask, in connection with this, as to how can there be more than one 'infinite number').

The seemingly careless use of 'infinity' leads to some extraordinary speculation. For example, in a Scientific American article[52] Max Tegmark expounds the theory that each person on Earth has an unlimited number of 'doppelgangers' spread throughout the universe. The claim is that every time we make a life choice, some of our replicas in the other universes make different choices and so our lives diverge. He expresses it thus:

'The simplest and most popular cosmological model today predicts that you have a twin in a galaxy about 10 to the 10^{28} meters from here. This distance is so large that it is beyond astronomical, but that does not make your doppelganger any less real. The estimate is derived from elementary probability and does not even assume speculative modern physics, merely that space is infinite (or at least sufficiently large) in size and almost uniformly filled with matter, as observations indicate. In infinite space, even the most unlikely events must take place somewhere. There are infinitely many other inhabited planets, including not just one but infinitely many that have people with the

same appearance, name and memories as you, who play out every possible permutation of your life choices.'

There would seem to be no empirical evidence whatsoever for this *'simplest and most popular cosmological model'* which in fact might be seen as a fantastical depiction. Dare one ask about the level of life-choices involved? If someone dithers whether to have tea or coffee one morning are zillions of like-beings doing the same? Do roughly half of the replicas choose tea and half coffee? Do their lives then diverge, perhaps according to the caffeine intake? And how does the universe 'know' how many replicas to create in the first instance if every life-choice leads to a divergence?

The hard truth is that when the impossible notion of 'infinity' is used in such contexts it limits nothing. Tegmark writes: *'In infinite space, even the most unlikely events must take place somewhere'* and thereby encapsulates the absurdity. Simply, if *anything* can happen then the word has no explanatory power whatsoever.

There is a more homely example of this kind of omnibus approach to 'infinity'. It is said, by some scientists, but also by tipsy sages in bars, that if a chimpanzee could:

a) type,
b) live for ever and
c) be motivated to keep hammering incessantly on typewriter keys,

then the animal would, with a limitless supply of auto-feed paper and self-replenishing ink, produce the works of Shakespeare. The implication is that in the endlessness of infinity 'random processes' would eventually do the trick.

More will be said shortly about the troublesome notion of 'randomness' but, allowing the idea for a moment, does anybody *really* believe that the ape would churn out even one stanza of Romeo and Juliet let alone the bard's entire *ouvre*? One day the zillionth descendant of the originator of the experiment would go along to the typing place, snatch up the most recent pages and cry triumphantly; 'At last! Othello!'

One thinks not

Give the chimp just a few more billion centuries and she will also, thanks to the 'definition of infinity', polish off not only Shakespeare's works but those of Tolstoy, Hardy and Dostoevsky, this essay and everything yet to be written; which would save mankind some work.

It is interesting that in fact the universe seems well-stocked with limits. We know that there is an absolute zero in temperature, we know that there is a fixed total of energy, we can, at any time, state the overall dimensions of the spread of heavenly bodies, we know that light has a constant speed. Maybe these are signs that we should be thinking on more manageable lines.

An objection might be that we cannot manage without the notion of infinity but the quotation[41] from the John Nichol book about Francis Bacon gives us the answer. If we imagine, against all the practical factors, a photon traveling away from us without impediment all we can say is that its journey is of indefinite duration. In fact, we can cover all eventualities with this commonplace notion of indeterminacy; we have no need to create confusion by allusion to the impossible state of infinity.

2. The 'Energy' Problem: Mind/Body

The second impediment to the production of a complete scientific account is the age-old conundrum as to how the physical and the mental relate to each other.

There are *monists*, who claim that the apparent split between body and mind is an illusion and there are *dualists*, who embrace the dichotomy.

Yet there is a further complication. The logic of traditional science is that the physical aspect of our beings came first, with the mental powers accruing gradually through the evolutionary process. However there are those who believe that we are essentially mental beings who 'construct' the apparent physical world, including its history, from our perceptions.

Thus, in this second split, there are the *realists*, who see the universe in essentially physical terms and the *idealists,* who give primacy to the mental aspects of existence. This double dichotomy leads to the following possible combinations:

	Realist	***Idealist***
Monist	The universe is a physical thing and consciousness is a by-product which will one day be explained in physical terms	The universe is a mental thing and the supposedly physical world is merely a construct of mental activity. It has no separate existence.
Dualist	The universe is both physical and mental but the mental aspect is in a separate 'spiritual' dimension.	The universe is a mental thing but there are underlying rules which make it imperative to think in terms of a 'real', separate physical aspect.

It is sure that many scientists fall within the 'monist/realist' camp. For them, mental activity is simply an 'epiphenomenon' which, according to the Concise Oxford dictionary, is: *'A secondary symptom, a mere concomitant of something else not regarded as its cause or result.'* The Behaviourists take this position to extremes, sometimes seeming to suggest that the epiphenomenon of mind might one day be made to vanish once the causal mesh of stimulus-response bonds is fully mapped.

But of course not all scientists think in these 'hard' terms. For example, the monist/idealist position is strongly argued by Goswami in his book, *The Self Aware Universe.* Goswami goes nowhere near solipsism but his essential message is that we need to emphasise very strongly the subjective at the expense of the objective.

The dualist positions have their champions too. Three hundred years or so ago the German mathematician and philosopher Gottfried Leibnitz propounded the doctrine of 'psychological parallelism' which held that mind and body are separate but that their activities directly parallel each other. Despite the huge advances in knowledge about the workings of the brain, this dualism seems still to pervade much of scientific thought thanks, in quite large measure, to the influence of Descartes.

Without delving deep into detail it can be said that no one of the four possible positions is satisfactory. Despite all the centuries of verbiage there is no 'received opinion' on the mind/body relationship. Some philosophers have tried to resolve the difficulty by asserting that brain events and mental events are identical. This 'identity theory' abolishes the need to find a causal link but it is alas not very illuminating. Brain events and mental events are palpably different; how can they be one and the same? And in any case, the abolition of the need to find a causal connection *between* mental and physical events does not also eliminate the need to explain the causal history of each aspect of such dual events.

The dilemma is expressed by in a report by R. G. Jahn et al in the Journal of Scientific Explorations[53]. They write:

'Indeed, although a myriad of theoretical and empirical attempts have been made to define the elusive concept of consciousness itself, curiously little agreement on its origins, substance, characteristics, or functions has yet been achieved. Some of these efforts relegate consciousness to a complex of emergent phenomena of the human brain, and thus to an ensemble of neurochemical and neuroelectrical processes. Others attempt to invoke quantum indeterminacy in explication of the brain function. While many philosophers of science maintain that the concept of consciousness is so intrinsically subjective that it must be excluded from scientific attention, others plead that scientific scholarship cannot indefinitely ignore such dimensions.'

Could it be, perhaps, that the increasingly sophisticated techniques of neuroscience will eventually provide us with a causal answer?

Two researchers in the field were given the chance to express their rival viewpoints on neural activity in a Scientific American article[54] in the October 2007 edition. Faced with the title, *'How Does Consciousness Happen?'* Christof Koch and Susan Greenfield combined for the opening section and wrote:

'How brain processes translate to consciousness is one of the greatest unsolved questions in science…it has utterly failed to satisfactorily explain how subjective experience is created.'

They suggest that there is not one single problem but numerous interrelated ones, especially concerning the deeper question of self-consciousness. They express the view that:

'Neuroscientists do not yet understand enough about the brain's inner workings to spell out exactly how consciousness ***arises*** *from the electrical and chemical activity of neurons.'* They go on to suggest that the first step is to determine the best neuronal correlates of consciousness (NCC)

The difference between them on the ways neurons work is a classical, perhaps even a gender-specific, one. Koch sees things in terms of structure whilst Greenfield focuses on process. Greenfield says: *'My own starting assumption is that there is no intrinsic, magical quality in any particular brain region or set of neurons that accounts for consciousness. We need to identify a special* ***process*** *within the brain.'*

In contrast Koch records that in his view:

'….consciousness is not some holistic property of a large collection of firing neurons that are bathed in a solution of neurotransmitters… Instead I maintain that specific groups of neurons mediate, or even generate, distinct conscious experiences.'

However, there is, it seems, another level of disagreement for Koch claims that:

'If we can find the right NCC, the direct cause-and-effect mechanisms that ***create*** *consciousness may follow.'*

Koch re-emphasises his position with:

'And soon enough, the growing ability of neuroscientists to delicately manipulate populations of neurons will move us from observing that a particular conscious state is associated with some neuronal activity to pinpointing causation – observing that a given population is partially or wholly responsible for a conscious state.'

Against this Greenfield writes:

'Recall that neither Christof (Koch) *nor I is attempting to explain* ***how*** *consciousness arises. We are not attempting to answer what Australian philosopher David Chalmers has dubbed the "hard problem": determining how physiological events in the brain translate into what* ***you*** *experience as consciousness. We are seeking a correlation…'*

She goes on to add:

'Neuronal assemblies do not "create" consciousness but rather are indices of a degree of consciousness.'

Then, very perceptively, she adds:

'We will not be in a position to find a solution until we know what kind of evidence would satisfy us.'

And this, surely, is the rub. Three hundred years ago Liebnitz was writing of 'correlations' which were guaranteed only by god. We are now as certain as can be that mental activity is always accompanied by brain events and science cannot put this down to the workings of a deity. But Greenfield has hit the issue head on; if we are to find a causal connection, what kind of evidence would satisfy us? What form of words would count as an explanation of the causal link between mental events and brain activity?

Whether the best model turns out to be based on process as per Greenfield or structure as per Koch we might then discover that the relevant aspects of the brain produce, for example, a fine mist. We could give the minuscule components of the cognitive vapour a name; 'thinkons' perhaps?

It would be an interesting scientific discovery and all manner of benefits might come from it *but we still would not be looking at a thought!* We'd be examining an intriguing mist which seemingly correlates with a thought.

At the risk of traducing an erstwhile philosophical way of construing things, we are surely faced with what might be called a 'category error'. If someone were to ask for a causal account of the way in which aluminium produces raspberry jam we would not waste too much time thinking about it.

It is here argued, therefore, that the mind/body problem, as traditionally expressed, is not solvable by science. Of course this statement on its own will not make the perennial hunger for an answer go away. But there *is* an explanation of this most subtle of relationships, one with very far-ranging consequences. It is presented in Part Three.

3. The 'Time' Problem: Causation

The third and final fundamental difficulty which science has in producing a general theory of the universe relates to the causal control of the operation of energy in space. Alphomism holds that time is the most general expression of the movement of discontinuous energy and thus this section has been given the title of 'the time problem'.

Later, some very substantial doubts about the interpretation of time by modern science will be expressed but for the moment the focus is on the three crucial scientific 'blind alleys' relating to causation which are:

- First cause (ie what brought about the beginning of time?
- Laws of nature (ie what sustains these laws through time?)
- Random events (ie what decides when 'random events' take place?)

1. First cause

Because science has its roots totally in determinism it is largely stuck with a linear way of thinking. When approaching the problem of 'where did everything come from?' it faces the difficulty expressed by Aristotle who wrote;

'It is absolutely impossible to have proof of everything; the process would continue indefinitely and the result would be no proof of anything whatsoever.'

One modern approach to this is to fall back on the phenomenon of the Big Bang. Some hold that the conditions at this stage of the development of the universe were unique. Because of this, the pre-explosion condition is often referred to as a 'singularity', a one-off.

In a Guardian article[55] Frank Close, professor of physics at Oxford University writes:

'Questions concerning existence "before" this singular happening are racked with philosophical debate; what does "before" mean if there was no space or time? Some popular science portrays a will-o'-the-wisp universe erupting as a quantum fluctuation out of nothing. Maybe it did, but if so then I would feel compelled to ask why it bothered. The "spontaneous" appearance of that first flash of searing heat…is beyond (current) experimental scientific enquiry.'

Professor Close's concern about the meaning of 'before' seems not to trouble his Cambridge colleague, Professor Hawking, who writes[56]: *'The concept of time has no meaning before the beginning of the universe.'* But surely Close is right to hint that there is an oxymoronic ring to the notion of a 'beginning of time'.

Close also alludes to the beginning coming *'out of nothing'*, a notion which Hawking seems to support when he asserts[57] that the pre Big Bang universe was of *'zero size'*. What can this mean other than, in defiance of Aristotle's dictum, everything came from nothing?

In fact, in the early pages of his book about time, Hawking writes[58]: *'One may say that time had a beginning at the Big Bang in the sense that earlier times simply could not be defined.'* but this takes us no further. For it to have any explanatory potency we surely need to have at least some idea as to what 'earlier times' might be.

One possible way of escaping the 'first cause' problem is simply to deny its existence as Nobel prize winner, Murray Gell-Mann[59] seems to be doing when he is quoted as saying that: *'Life can perfectly well emerge from the laws of physics and accidents, and mind*

from neuro-biology. It is not necessary to assume additional mechanisms or hidden causes.'

But of course, for there to be laws and accidents there has to be something in which these can operate and occur. Presumably Gell-Mann was taking existence for granted, claiming that this is all we need to do.

Another escape route from the stone wall of the singularity is to suggest that our 'Big Bang' wasn't a one-off at all but part of a very long sequence. In an article[60] James Randerson outlines such a point of view.

The rationale for this comes from an attempt to deal with Einstein's 'cosmological constant', that is, the force which seems to be necessary to account for the continuing expansion of the universe. Randerson defines it thus: *'The cosmological constant is a mathematical representation of the energy of empty space, also known as "dark energy", which exerts a kind of anti-gravity force…'*

The problem is that the force seems to be too small, by a huge margin, to overcome the contracting effect of gravity. However, it is said that the case would be very different if there had been not one bang but a long cycle of expansions and contractions with associated explosions.

Randerson quotes Neil Turok, a theoretical physicist at the University of Cambridge. Speaking of the current orthodoxy of the single explosion, Turok says: *'People have inferred that time began then but there really wasn't any reason for that inference. What we are proposing is very radical. It's saying that there was time before the Big Bang.'*

Paul Steinhardt, the co-author of the 'multiple explosions' paper, suggests that rather than fourteen billion years the universe must be at least a trillion years old. Turok is reported as commenting: *'There doesn't have to be a beginning of time. According to our theory, the universe may be infinitely old and infinitely large.'*

The earlier discussion about using the term 'infinitely' as a cover for an inability to form a theory clearly has relevance here.

Maybe it will transpire that there have been very many cycles of expansion and contraction but no matter how many there have been, we are still no nearer dealing with the 'what before that?' question. Where did the first Big Bang come from?

It might be suggested that rather than cite a long series of explosions as an escape from the 'singularity' problem we could adapt multiverse theory. Since there are supposedly untold numbers of 'universes' which we can't see, maybe there are untold numbers of cosmic explosions going on all the time but whichever way the conventional linear method explores; singularities, series, multiplicities, there is always going to be the question of 'All very well, but what before *that*?'

The only answer we seem to have at the moment to the 'first cause' question is 'infinity' and that, as argued earlier, is nothing more than an emperor's clothes cloak over the naked body of ignorance.

2. Laws of Nature

Science relies utterly on the undeniable fact that Nature is subject to what seem to be immutable laws. If it is to produce a *complete* account of the universe it must surely tell us how the laws came into existence and how they are sustained.

Hawking expresses the view[61] that '*The whole history of science has been the gradual realisation that events do not happen in an arbitrary manner.'* His further opinion is that 'god' decrees the laws.

Many scientists are also theists but Alphomism is not content with the recourse to mystery.

3. Randomness

Science is, of course, all about causation. It looks for forces and laws; it makes testable predictions.

It is therefore all the more extraordinary that it allows liberal use of the notion of randomness.

The word 'random' has a colloquial and somewhat perverse meaning. We use it in relation to games such as roulette where we choose not to do the physics. We *could* predict the final resting place of the ball if we had the instruments and the patience to do so. Of course we elect not to because that would spoil the fun. The same applies to the machines which pick lottery winners. Given a super-scientist, the starting information and the data on the forces involved and the outcome could be reliably calculated. Machines, and little bobbling balls, are potentially predictable.

But surely it is a different kind of randomness which Rosenblum and Kuttner allude to when they write[62]:

'While classical physics is strictly deterministic, quantum mechanics tells of the ultimate randomness of Nature.' And, in the same place: *'After all, much of what happens in everyday life has randomness.'*

It is apparently being suggested that, in everyday life, 'things just happen', presumably as an outcome of a-causal quantum activity.

But this is a very odd conclusion for science to come to. Having journeyed so far with the belief that every event has a cause, why abandon it at this stage?

One response to this question might be 'Heisenberg'. Goswami[63] advances the view that '*The uncertainty principle throws a Molotov cocktail into the philosophy of determinism.'*

Reinforcing this view, Hawking[64] tells us that total determinism was a 'standard assumption' until the early 20th century, a comfort zone which was destroyed by the 'conundrum' of the radiation of stars. This, according to the scientific principles prevailing at the time, should occur at an 'infinite' rate. When it was discovered that, in fact, it does not, Max Planck made the seminal suggestion that radiation is emitted not continuously, as supposed, but in 'quanta', a proposal which is now the orthodoxy.

The fact of quanta led to deep difficulties. Whereas meters can measure flows and thus provide us with predictable pattern the individual tiny packets of energy seem to move unpredictably.

As noted earlier, there is confusion as to whether the unpredictability is a problem of measurement or evidence of something much more fundamental; that is, there appears to be a weak and a strong version of uncertainty. Whatever, Heisenberg worked out that the uncertainty in the position of a particle times the uncertainty of the velocity times the mass is never smaller than a fixed quantity. This lower limit became known as Planck's constant. Hawking tells us that[65] *'Heisenberg's uncertainty principal is a fundamental, inescapable property of the world'*. He expresses the opinion that the implications of the uncertainty principle are still not appreciated by many philosophers and agrees with the view that Heisenberg's work puts an *'end to determinism'*

Yet almost at once Hawking concedes that we can imagine that there *are* laws which a supreme being could observe but suggests that this is of *'no use to us'*.

But this, surely, is an absolutely critical point. Our technical inability to measure without disturbing the system in no way implies that we are dealing with a-causality. If in fact there *are* laws, the circumstance that we cannot discover and describe them does not eradicate determinism; it merely sets the limits to our knowledge and, presumably, powers.

In a newspaper article[66] Johnjoe McFadden explains that one of the properties of atoms is that they spin[n10] but they do so only at rates which are multiples of Planck's constant. This 'step' effect produces quanta rather than a continuous change. McFadden writes: *'When the atom decays it does so entirely randomly, entirely without cause…Quantum mechanics offers us a world without reason.'*

But how can we know with such certainty that there are no causes? Surely it would be more consistent for a scientist to say; 'There perhaps are forces determining quantum jumps but we don't know what they are,' rather than 'quantum jumps just happen – for no reason whatsoever.'

This latter use of 'random' as a cover for ignorance is unacceptable. As with 'infinity', it is no more rational than faith in a transcendental god.

Alphomism holds that the deeper 'strong' interpretation of uncertainty is almost certainly true. That is, if the problems with measurement could be overcome we would in fact find that very many sub-atomic events are not subject to deterministic laws. However, this does not mean that they are uncaused. The way in which this apparent paradox is resolved is outlined in Part Three.

PART THREE: A FRESH APPROACH

Chapter 1: Foundations

1. Simplicity

It is sometimes said that Francis Bacon[n9] was the true begetter of the principle of objectivity in science. The rigour has produced spectacular results. The forming of theories, the making of predictions and the testing have provided us with sure knowledge and wonderful technical expertise. It is not surprising that some scientists feel able to consign mental activity to the 'epiphenomena' compartment.

Yet, as the foregoing pages have hopefully established, there seem to be limits to the potency of the objective method. Relativity and uncertainty have shaken the once-reliable foundations. Quasi-religious notions such as 'infinity', 'randomness' and 'singularity' are used, sometimes desperately it feels, as props. Fanciful theories involving multiple universes and ever-hidden, 'curled up small' dimensions are fervently embraced, even though they can scarcely be convincingly articulated let alone supported by a jot of empirical evidence.

Science, led very significantly by mathematics, becomes ever more abstruse. In a brief review[67] of the Stephen Hawking book *'The Universe in a Nutshell'* Joseph Silk, of the Department of physics, nuclear and astrophysics at Oxford University writes:

'The more complex ideas, like imaginary time for example, are just concepts, a mathematical metaphor almost, and we are a long way from understanding these things. Most of my colleagues still don't and neither do I, so there is no point in agonising over the chapters, trying to get a complete understanding of them. It would be almost impossible to achieve that anyway, without using complex maths that would be out of the reach of most physicists, let alone anyone else.'

And yet it would seem that the universe is essentially simple. The most fundamental relationships are satisfyingly neat. Some exemplars are:

Force = mass x acceleration
Voltage = current x resistance
Power = voltage x current
The inverse square law

The volume, temperature and pressure of gases are linked by simple equations
Avogadro's simple hypothesis about gas molecules
Energy = mass x the speed of light squared
The force of gravity is constant
There is an absolute zero temperature
Planck's constant

Occam's cry[n7] rings through the ages; theoreticians should aim for the maximum simplicity yet we have reached a state where even highly trained professionals in the field struggle to grasp what is going on.

A central theme in this essay is that simplicity can be regained if the religious-like devotion to absolutism is eradicated. We need to embrace a broader form of relativity and, although we should aim to make our theory of the universe as objective as possible, we must give the true and, as it transpires, utterly crucial central, role to subjectivity. It is only through this that the infinity paradox, the mind/body problem, and the difficulties associated with causation can be eradicated and simplicity restored.

2. Metaphysics

If, as proposed, the account of the universe has to encompass subjectivity then it is obvious that it will be 'beyond physics' and therefore 'metaphysical'.

There is support form some scientists for a metaphysical approach. For example Rosenblum and Kuttner write[68]: '*Along with Bell*[n11]*, we suspect that something beyond ordinary physics awaits discovery'* .

Rosenblum and Kuttner reinforce this message[69] with the view that quantum physics '*…hints at the existence of something beyond what we usually consider physics.'*

As has been observed, some practitioners (Einstein and Hawking being prime examples) go even further and invoke a deity to 'explain' the phenomena which lie beyond the reach of science but this somewhat drastic step, it is here argued, is not necessary. As will be shown shortly, metaphysics can come up with at least one plausible account which involves no gods.

And it is far from true that metaphysics, being outwith the scientific pale, is some wanton, ill-disciplined creature. The fact that it is sometimes done badly does not justify a blanket rejection, for there are at least five tests of the efficacy of a metaphysical theory which should be applied. These are;

1. Logic

As mathematics is to the objective world of science, so logic is to the subjective aspect of metaphysics. Logic provides the most rigorous assessment of a metaphysical theory.

Frequently the speculations of the mathematicians throw up notions such as infinity, randomness, multiverses and extra dimensions which, because the sums add up, are widely accepted. But mathematical elegance is not sufficient; there is the further question as to logicality. Such physically un-testable notions as 'infinity' are metaphysical rather than scientific and, as hopefully has been shown, some of them fail the logical scrutiny.

2. Scientific Correspondence

Does the theory unjustifiably offend against a reasonable interpretation of accepted science? If it does so then it must be modified or rejected.

3. Prediction

Does the theory lead to predictions? If so, are any of the predictions of a type which might eventually become subject to scientific testing? Are the ones which are not 'scientific' at least likely to be at some time validated (or otherwise) via subjective experience?

4. Coherence

Is the theory dense to the point of incomprehensibility? Is it confused to an extent which makes it unintelligible? Are there inherent contradictions? All of these and doubtless more provide grounds for the assessment of a metaphysical theory.

5. Range

Finally, metaphysical theories, like their scientific counterparts, are devised in order to *explain*. Therefore one very potent test is to check how many phenomena are explained by the theory, Very often, many of the individual hypotheses will not be testable for the foreseeable future but a combination of proposals can produce a convincing picture. A simple, but relevant, question therefore is; 'Does it *satisfy*?'

This last test might be invidious to a thoroughgoing objectivist but it is entirely proper that a theory which embraces the subjective should allow a measure of subjective appraisal. As the Alphomist argument unfolds, it will be strongly suggested that what is contained within our minds is complex and to a considerable extent 'informed' by fragmented data about the universe. When we are striving for ideas we are, it is suggested, putting pieces together. *'That makes sense'*, when uttered after a rational appraisal, is an endorsement very much worthy of acceptance even if the idea expressed falls short of full scientific rigour.

Although Alphomism is intended to meet all these criteria it should be noted that is not offered as a final account. It is intended as a step along the way. It raises many further questions and this, perhaps, is a sign of strength.

3. An Incentive

At this point, before the supporting arguments have been advanced, a reader who is hostile to metaphysics might be ready to abandon reading but the following argument is offered in the hope of staying premature rejection.

It will be argued that subjectivity is elemental and that conscious beings possess a measure of free will. Of course these conclusions might not be acceptable but if they are temporarily conceded, for the sake of argument, then it follows that we are not just passive beings propelled by forces but rather we are *significant agents* in the developmental process. If this is so, we need some guidelines or policy with which to inform our decisions. It is strongly claimed the total picture presented by Alphomism can act as a navigational chart. Without it, or something similar, we have no basis for making universe-determining judgements.

The implications of the idea that conscious beings will exert ever-increasing control over the universe are so profound that it is surely sensible at least to consider the proposal that we are not part of a totally determined machine.

4. Axioms

The non-solid basis of existence has been discussed earlier; the ephemeral nature of energy is apparent. It therefore makes sense to seek some axioms, some fundamental principles on which the theory can be based.

There are, of course, what seem to be absolutes in the physical domain, for examples, the speed of light, the total of mass in the universe and the ultimate zero temperature but the concern here is with concepts rather than practicalities. Aristotle expressed things thus:

'All other thinkers derive everything from contraries. But neither 'all things' nor 'from contraries' is right; nor do they tell us how things in which contraries are present can be made out of them since contraries cannot act upon one another. Our solution is simple; we say there is a tertium quid, the substratum.' He declared also that *'What is primary has no contrary.'*

The summary of Alphomism presented at the beginning of this essay proposes that the 'Nature' phase of the universe is necessary to establish meaning through the generation of 'opposites'. If this is so, it is equally sure that Aristotle is right to argue that there has to be something other than opposites. We need a foundation, some core concepts.

According to Alphomism, there are but two of these; space and energy. These are our existential axioms, our intellectual bedrock. They are all we can take for granted and all that we need.

Many might argue that time should be considered as a fundamental but Alphomism proposes that, though of central importance. it is, so to speak, 'on the next level'. The

argument in support of this is that time derives from the operation of discontinuous energy in space. In fact, it is maintained that there is a phase of the universe where conscious beings experience timelessness. This is a subjective phenomenon (of which more anon) but it is nonetheless real. It has a describable physical correlate, that is, an absence of discontinuity.

Anyone wanting to argue against the ultimate status of energy and space would have to show that there can be a form of existence which is space-less and/or energy-less that is, they would have to prove that 'space' and 'energy' have 'opposites'. Alphomism proposes that this mental experiment is impossible to do

(It is perhaps worth noting that an Oxford philosopher called P. F. Strawson once bravely tried to describe a 'no-space' world[70] but the account is unconvincing. In his model there are sounds; these have sources and listeners which inevitably entail location and therefore invalidate the attempt).

5. Definitions

Much will emerge in the ensuing pages about the Alphomist interpretation of the three fundamental notions of 'energy', 'space' and the derivative 'time' but it is perhaps useful to offer broad definitions at this stage. These are set out immediately below. There is also presented, for the avoidance of confusion, a broader explication of 'universe' than the one given in the initial summary of Alphomism.

1. Energy

Everything that exists and happens in the universe does so through the agency of energy. Even the 'solid', 'collapsed' sub-atomic particles, of which all things are made, are not really solid at all. As Rosenblum and Kuttner write[71]:

'....although physicists talk of atoms and other microscopic entities as if they were actual physical things, they are really only concepts we use to describe the behaviour of our measuring instruments.'

So ephemeral is the basis of all existence that Niels Bohr, a famous founding father of quantum mechanics, was inspired to say[72] that:

'It is wrong to think that the task of physics is to find out how nature is. Physics concerns what we can say about nature.'

Alphomism holds that Bohr's remark is just as relevant with 'energy' substituted for 'nature'.

Our conception of energy is necessarily broad-based but we have plenty of experiences of a direct impact of energy through, for example, the force of a blow or the disturbing effects of an electric shock. We extrapolate from electrical and magnetic phenomena,

from the flow of water, the pressure of gases and innumerable other exemplars to form our energy image.

Energy is our back-stop. It might be defined as: *'The basis of all existence – the stuff of objects, mental activity, manifestations and forces'*

The concept is, however, an *abstraction*, it is has no unitary material form; it is an 'ideal', a Platonic notion.

2. Space

A dance teacher says to the pupils; 'Run around and find a space.' The idea of space implies an emptiness, a void into which something could be put.

But we can also imagine the process of removing something and leaving a space.

By inference, objects 'occupy' space; the space is still there even though it is occupied.

There are many questions concerning the relationship between energy and space which are examined later. For the moment a simple definition of space is offered here; *'Space is that in which energy inheres'*.

Like 'energy', space is an *abstraction*. It is not 'real' in the sense that it can be directly perceived or analysed; it is a mental construct from all the myriad experiences of space which we have in everyday lives.

3. Time

Alphomism defines 'time' as '*the most general expression of the operation of discontinuous energy in space'*. At the most fundamental level it is the combination of two abstractions and is thus itself *an abstraction*. We have very many examples of temporal processes in everyday life but, as with space and energy, there is no physical manifestation of 'pure time' – no energy field, no stream, no over-arching process. Time is not a form of energy nor anything that could be analysed. As with space and energy, we know of time *a priori*. Our lives are processes which we *experience*. We also *perceive* processes; the sun rises and sets, the seasons come and go

It will be seen, therefore, that according to Alphomism all three of the fundamental universal concepts are generalizations from multiple particular experiences. It is suggested that much confusion has been generated due to the 'reification' of these ideas.

They are not materially real but they most certainly are mentally real.

4. Universe

Paul Davies[73] describes many interpretations of the word 'universe' including:

- the 'observed universe' (that is encompassing all we can perceive at the moment)
- the 'observable universe' ('everything within the horizon'[n12])
- the 'entire universe' (everything, including things beyond the horizon)
- the 'pocket universe' (allowing for the 'multiverse' idea)
- the 'multiverse' (which includes all pocket universes)

The Alphomist definition has already been cited as *'everything that has existed, does exist and will exist'*. This has been chosen simply for clarity. If 'universe' is used in a limited way it robs us of an easy way of referring to 'everything'.

The Alphomist version evidently entails that the term 'many universes' is not acceptable. If in fact it turns out that there are cosmic aggregations other than the one of which we are directly aware then these, it is suggested, should be deemed to be part of the universe. If one or more of these currently unobservable systems comes to light they can be given names. We could perhaps refer to 'The Beta Cosmos' or, if there are indeed zillions of separate systems, then Cosmos 89076539846009876 and so on

There being no evidence yet of the existence of other systems, and being true to Occam[n7], Alphomism holds that we should deal with what we have, which is a vast cosmic array, a system of energy operating in space all of which, taken together, is 'the universe'.

Chapter 2: Space

It was argued in Part One that 'infinity' is inherently 'un-cashable' and un-provable and therefore of no use to theories of the universe. This chapter explores the ways in which an 'infinity-free' model can be built and it does so primarily via an examination of the concept of 'space'.

There would seem to be three possible broad interpretations of 'space', as follows. It could be:

1. a total emptiness, an absence of all energy. In this conception, space exists regardless of whether it is playing host to energy or not, or

2. a material thing with properties which affect the operation of inherent energy or

3. the background to the operation of all forms of energy but which has no existence separate from energy.

In this, as in all discourse about the universe, the search is not for an absolute account but for 'the best we can say.'

1. Space as Absolute Emptiness

There are difficulties with adopting the 'space as absolute emptiness' formulation. One of these has already been explored, namely the fact that it leads to the notion of endlessness. Indeed, this is surely sufficient to rule it out as a contender but there is another problem.

We 'cash' the word 'space' through everyday experiences of filled and empty spaces but our use of the term is relative. The assertion that there's an empty space rarely, if ever, alludes to a total void. An 'empty' cupboard contains air, dust, perhaps a layer of paint, a spider or two…

It is a good question as to whether or not we can extrapolate from this to form an image of totally empty space. For one thing, we, as observers are always present in any such conception. For another, even if we restrict our imaginings to pitch darkness, then there is at least the darkness. Darkness is not nothing.

Overall, 'space as absolute emptiness' seems not to be a strong contender.

2. Space as a Material Thing

Struggling to come to terms with gravity which, unlike other forces, seems to operate instantly and universally, Einstein suggested that it makes sense to think of space as a thing with inherent properties.

This, too, has its drawbacks. We could conceive of space as, say, a mesh of gravitational forces which guides the movement of bodies and other manifestations of energy. But if space is a mesh, it must be made of something. If it is made of something, that 'thing' surely has to be a form of energy.

In the newspaper article referred to earlier[37] Peter Coles claims that, according to quantum physics, there is no such thing as empty space. He writes: *'The "vacuum" is filled with an indeterminate soup of virtual particles, ceaselessly springing into and out of existence'* and goes on to suggest that matter and space are *'inextricably linked'*.

Should we view these virtual particles as being a part of space or rather just another manifestation of energy?

Alphomism takes the view that it is conceptually 'cleaner' to keep space and energy notionally separate and thus to see the virtual particles not as *constituents* of space but rather just acknowledge that they are ever-present manifestations of energy.

4. Space as Neutral but Dependent

On this interpretation the 'best we can say' is that space and energy are separate but invariably interdependent. That is, there is never space without energy.

This approach possibly gets some support based on evidence provided by the WMAP satellite[n13]. Analysis of the data suggest that only 4% of the total of universal energy is involved in the 'observable universe'. There is 23% of dark matter and 73% 'mysterious' stuff variously called quintessence, vacuum energy or dark energy.

Max Tegmark cosmologist at the Massachusetts Institute of Technology, writes[52] that WMAP *'… recently measured the fluctuations in the microwave background'* and reports that:

'The strongest fluctuations are just over half a degree across which indicates – after applying the rules of geometry – that space is very large or infinite. (One caveat: some cosmologists speculate that the discrepant point on the left of the graph is evidence for a finite volume)'

This is a somewhat major caveat to put in brackets! but in any case, Alphomism rules out the use of 'infinite'. Nonetheless, it seems from this that the 'very large' universe spreads far beyond the limits of the observable element and that this space is filled with microwave energy.

Reporter, Alok Jha, tells[74] of researchers Meghan Gray of the University of Nottingham and Catherine Hymans of the University of British Columbia who created *'the most detailed map'* of dark matter. He comments:

'Dark matter accounts for almost all the mass of the universe, but because it does not emit or reflect radiation, it is impossible to observe directly. However, because it has mass, scientists can infer its presence by its gravitational effects on the normal matter surrounding it.'

Since this comment was made there have been developments. It is claimed, in an April 2008 newspaper article,[75] that Italian scientists have detected dark matter. It is suggested that;

'The discovery…could end a 70 year old race to find the elusive "dark matter" that physicists believe accounts for 90% of the mass of the universe.'

It goes on to say that a very large detector has picked up signs of dark matter which suggest that it could be made of theoretical particles known as axions. It is noted that this one experiment is unlikely to be taken as hard proof but there is a quotation from Franz Halzen, an astrophysicist at the University of Wisconsin-Madison which runs:

We are pretty sure now that this is not a statistical fluke. We should pay attention to this.'

However, not everyone goes along with the idea that it is 'dark matter' which is the majority presence. Prior to the Italian experiment mentioned above, Laurence Krauss, Physicist at Case Western Reserve University, said[76]:

'We are now pretty sure that the dominant energy-stuff in our universe isn't normal matter, and isn't dark matter, but rather is associated with empty space.'

There are confusions about 'empty space' playing host to energy but what seems not to be in dispute is that there is some form of energy which extends far beyond the observable array of cosmic bodies. As noted above, Alphomism suggests that the 'best we can say' is that whenever there is space there is also energy and, of course, vice-versa.

As yet science has no clear account of the nature of the 'background' energy but a strong suggestion about this will be made in the next chapter.

5. The Shape of Space

For a very long time many human beings thought of Earth as flat. There is now, of course, overwhelming evidence that it is spheroidal.

We look out from our planet and see the cosmos all around. It is very natural to assume that we are on a sphere within a sphere; that is, that the finite envelope of space is similar in shape to planets and suns.

If it is so, there is a very interesting question. On Earth a straight-line journey eventually brings us full-circle back to the starting point; is the same true of space? If we could send out a fantastically fast spacecraft and somehow keep it on what seemed to be a straight trajectory would it eventually come back to us on the opposite side of the planet to the launch site? In other words, should we think of space as geometrically flat (echoing the flat-earthers) or as in some way curved?

For space to be curved it would have to be that there are forces which bend the trajectories of objects. Of course there is one such, namely gravity. But there is at least one other general force; that is the one which causes the universe to expand.

Krauss[76] tells us that:

'…according to general relativity (geometrically flat) means that there is a precise balance between the positive kinetic energy associated with the expansion of space and the negative potential energy associated with the gravitational matter in the universe so that the total energy is precisely zero...'.

Davies explains[77] that: *'In Einstein's mathematical model of the universe the curvature accumulates so that, averaged out over billions of light years, the shape of space*

resembles a three-dimensional version of the surface of a sphere, which is referred to as a hypersphere.'

But this is odd because, by analogy with the Earth, if there is inescapable curvature then there should be an interior (the equivalent of underground) and also an exterior (the equivalent of space). How could we ever get 'inside' the hypersphere (dig into it) or leave its surface (take off)?

Davies's view[78] is that Einstein's model is *'wide of the mark'* but that at least it introduced '*several important features'*. Dealing with the problem of the inside and outside of the proposed hypersphere Davies advises us not to worry that the supposed arrangement is not imaginable because, he says*, 'it makes good mathematical sense.'* He explains: *'We humans … are restricted to the three dimensions of space, so the issue of what, if anything, lies 'inside' Einstein's three-dimensional hyperspherical space is moot'*.

'Moot' seems an odd choice of word in the light of what follows:

'….but because we are trapped in the hyperspherical three-dimensional 'surface' it doesn't make a jot of difference to us whether the interior region is there or not, or what it contains. Much the same goes for the exterior region, the analogue of the space outside the balloon.'

This is perhaps a strange attitude for a scientist to take. If the supposed 'interior' is forever inaccessible then it is an unreal entity; it will never be 'cashable' and should therefore be another candidate for Occam's razor. If it is real, then we should want to find out about it. Surely we are 'in' space rather than 'on' it and it is no trivial matter to change this basic perception.

It is tempting just to abandon the hypersphere model but at least it provides one way of explaining why the background radiation in the universe is apparently so evenly distributed. Davies writes[79]: '*The fact that this radiation is so uniform already indicates that the universe out as far as we can see, is at least fairly regular in shape.'*

Anything which replaces the hypersphere idea has therefore to account for even-ness. Searching for the optimum model, scientists have come up with many alternatives, including a doughnut, an endlessly repeating set of dodecahydrons, and a soft sphere that has been squashed. One of the main contenders in recent times has been the 'saddle'. That is, instead of the 'positive', convex structure of the outside of a sphere we are invited to think of an open, concave shape. Tim Radford[80], reporting on a New Scientist piece, writes of an *'infinitely long'*, 'horn of plenty' idea of the universe. He refers to what is known as the 'Picard topology' and quotes Professor Frank Steiner of the University of Ulm who claims that the horn shape best explains the even distribution of cosmic background radiation.

Happily, modern technology provides a way of testing the 'shape' of space because the curvature notion leads to predictions about temperature fluctuations in the background radiation. The WMAP[n13] probe provided much of the data.

Davies[81] tells us that:

'Before WMAP was launched, theorists had already worked out how big the physical sizes of the strongest fluctuations should be. Converting that into apparent angular size in the sky depends on the geometry of space: if the universe is positively curved it would make the angles appear larger, while a negative curve would make them smaller. If the universe is geometrically flat (i.e. has Euclidean geometry) the angular size of the strongest hot and cold fluctuations should be about 1^0 across. The results that flowed back from the satellite were definitive. The fluctuations were very close to 1^0 in size, a result confirmed by ground-based and balloon-based experiments. Cosmologists then declared that, to within observational accuracy of about 2 per cent, space is flat.'

It is worth repeating that this means 'geometrically flat', that is, subject to Euclidean geometry. Space is three-dimensional but there is no inherent curvature.

The 'flatness' of space tells us nothing about its overall shape; it could be ellipsoidal, sausage-like or perhaps other.

As ever, Alphomism opts for the simplest account. It is surely highly likely that the material blasted out by the Big Bang met very little (or perhaps no) resistance but if there *was* resistance then very likely it was evenly distributed. We know also that the forces which instantly came into existence, gravity and the cosmological constant, are the same everywhere; so what else would the outwardly hurtling matter do than produce a rapidly expanding spheroid? It is also surely relevant that the vast majority of cosmic bodies are roughly round.

So, according to Alphomism the universe is finite and, at least approximately, spherical. We are in space and there is no mysterious inner dimension. Outside the sphere is nothing (of which more very shortly).

There is an interesting question as to whether dark energy was condensed at the time of the Big Bang or whether it was already distributed, in which case it would be an envelope into which material expansion could take place. The alternative, of course, is that it was also condensed, in which case the expansion was into nothingness, with energy creating space as it pushed outwards.

For reasons which will emerge, Alphomism favours the idea that dark energy was already distributed, though there is nothing axiomatic about this stance. But before moving on from the 'shape of space' discussion there are two major problems to cover.

Firstly, cosmologists believe that the universe looks more or less the same whatever the point of view. If it is spherical and thus has an outer edge, then people on planets close to

the edge would presumably, when looking towards the outer limit, see no further galaxies. They would, in other words, have a view very different from the one we have.

Secondly, there are some indications that there is no centre to the universe; the Big Bang can, from some points of view, seem to have occurred everywhere simultaneously. Yet if the cosmos is truly spherical then it must have a centre, and this, it is reasonable to assume, would be the place where the explosion originated.

So, we need to explain how the sphere of space can *seem* to be;

- without a defined limit and
- without a centre

Alphomism proposes a model which begins with the simple image of the sphere. This is only an aid, a mental crutch for, as will emerge, the proposed model is much subtler.

With the idea of a sphere comes the notion of some galaxies close to the edge. The 'edge' is also a notional device.

It is predicted that as energy from notionally peripheral galaxies approaches the 'edge' it undergoes quantum changes. Still sticking to the simplified model, it is proposed that non-locality and entanglement *instantaneously* shift the edge-bound energy to precisely the opposite side of the universe. In crude terms, the pattern of energy vanishes and reappears billions of light years away.

On this interpretation, the crew of a spaceship which is hurtling towards 'the edge' would perceive no disintegrations and no edge. And because energy has always behaved in this way they would *expect* no edge. They and their predecessors would always have seen the 'opposite side' galaxies as their neighbours.

It follows that whatever direction a spacecraft travels it could continue in a 'straight' line and return home to the side of the base planet opposite to the lift-off point. It does this not because of inherent curvature but through the operation of quantum properties.

It is sure that the way in which dark energy conjures up this trick is more sophisticated than has been described but the model explains why there seems to be no centre; all planets or none can be thought of as being at the centre. Effectively all galaxies or none can be seen as 'at the edge'.

It is possible that Hawking was alluding to some such model when he wrote[82]: '*We see later that when one combines general relativity with the uncertainty principle of quantum mechanics it is possible for both space and time to be finite without any edges or boundaries.'* Much later in the same book, however, he is careful to point out[83] that *'…the notion that space-time is finite but without boundaries is just a proposal, not a deduction'*

But maybe Hawking had something else in mind along the lines proposed by Davies[84] who comments: '*It is possible for the universe to be finite in volume without possessing a centre or an edge' - ie if space is 'warped'.*

As already noted. the model proposed here does not depend on a 'warping' of space but on the operation of quantum properties.

6. Nothing

If the universe is finite, either as a fixed envelope or as an expanding one, then there is the obvious question as to what is 'outside' this massive container.

The Alphomist answer is 'Nothing'.

Paul Davies writes[85]; *'Now, let's consider what is meant by 'nothing' – clearly it is empty space.'*

This, according to Alphomism is a misconception. 'Nothing' means literally 'no thing'.

It will perhaps be countered that, just as we cannot imagine infinity we cannot form a mental picture of 'nothing' for there will always be, at the very least, darkness in our picture. But the beauty of the notion of 'nothing' is that it is the one word which is 'cashed' by a cessation of mental activity. 'Nothing' does not imply darkness nor an abyss; it is an instruction to stop trying to perceive and conceptualise.

Chapter 3: Energy

The second problem standing in the way of science producing a complete account of the universe pertains to the role of the subjective. It was argued earlier that, of its objective nature, science is precluded from dealing satisfactorily with this problem. Nonetheless, energy must be involved in mental activity. The task, therefore, is to find some way of accounting for this.

The summary of the position argued for thus far is that brain events and mental events are;

- irrevocably linked
- not causally related
- not identical

There would seem to be only one way in which they can be related, namely complementarily.

1. Complementarity

Karl Jung[86] wrote:

'Since psyche and matter are contained in one and the same world and moreover are in continuous contact with one another…it is not only possible but fairly probable even, that psyche and matter are two different aspects of one and the same thing.'

The 'fairly probable' can surely be strengthened in the light of the findings of quantum mechanics. Rosenblum and Kuttner[87] describe the relationship which exists between the particle and wave aspects of microscopic entities in this fashion:

'The two aspects of a microscopic object, its particle aspect and its wave aspect, are 'complementary' and a complete description requires both complementary aspects but we must consider only one aspect at a time.'

The same authors tell[88] of a fundamental dispute between Francis Crick (co-decipherer of the DNA code) and Australian philosopher, David Chalmers. Crick is quoted as claiming that all of our mental experiences:

'…are in fact no more than the behaviour of a vast assembly of nerve cells and their associated molecules'.

This can perhaps be seen as a version of the Identity Theory but in total contrast Chalmers says:

'It follows that no mere account of physical processes will tell us why experience arises. The emergence of experience goes beyond what can be derived from physical theory.'

In the account of the dispute, Chalmers is said to hold that mental experience has to be seen as primary. He suggests, in agreement with Jung, that information '…*has two basic aspects, a physical aspect and a phenomenal aspect.'*

Commenting on Chalmers' position, Rosenblum and Kuttner say that; *'This smacks of the situation in quantum mechanics, where the wavefunction also has two aspects.'*

And, seeming to concur with this kind of analysis, Paul Davies has put it this way[89];

'*In some manner…life, mind and physical law are part of a common scheme, mutually supporting.'*

So, microscopic particles have two aspects which can best be described as waveform and particular. Higher level brain activity also has two aspects, the mental and the physical. It is surely difficult to resist the drawing of a double analogy, namely:

- the wave form is equivalent to the mental aspect
- the particle form is equivalent to the physical aspect

If it is the case that the smeared version of a microscopic entity is associated with the subjective and the collapsed version with the objective, then the startling conclusion has to be that *all* energy, even the tiniest manifestation, is blessed to some degree with the objective/subjective duality.

This possibility has not escaped the attention of theorists. Rosenblum and Kuttner tell us[90] that:

'Some philosophers see a continuum and even attribute a bit of consciousness to a thermostat.'

But if a thermostat, why not a table or a twig? It is of course true that a thermostat is evidently processing information and is capable of behaviour (ie switching a device on and off) but a piece of wood is forever changing as a result of environmental factors. If there is a cut-off point, where the proposed rudimentary consciousness begins, where would it be drawn? It will be argued shortly that no such demarcation is possible nor necessary.

There are other far-reaching considerations relating to the 'different aspects' approach to the mind/body problem. Not the least of these is the fact that we might have to develop a notion of 'subjective energy'. These weighty matters are explored below but first, consideration has to be given to the process of the emergence of self-consciousness. And this, it is proposed, is all to do with complexity.

2. Complexity

The hypothesis enunciated above is that *all* manifestations of energy have waveform and particle aspects and thus have elements of physicality and mentality.

It is suggested that in the tiniest manifestations the conscious aspect is almost vanishingly small but that as energy forms into more complex aggregations the conscious elements combine. The scope of things is indicated by the fact that it is only human beings, whose brains contain one hundred billion cells, who reach the level of full self-consciousness.

There is, on this analysis, no evolutionary magic moment, no quantum leap from unconsciousness to consciousness. All that matters, in the continuum from almost zero mentality to self-awareness, is the extent to which energy is organised.

It should be noted, though, that a (literally) vital element in the creation of complexity is *movement*. Obviously, everything that exists has the interior movement of its constituent particles but it is a different matter when entire aggregations of particles move in relation to each other. A coil moving through a magnetic field produces electricity. Thus it is not

surprising that organic entities, the most complex things in existence, are the ones that manifest consciousness. Within a complex living organism there is constant flux.

It used to be assumed that there was a great qualitative gulf between humans and animals but there is evidence that creatures lower down the order are cleverer than was once supposed.

A newspaper report[91] tells of research which shows that even fish are capable of counting. Christian Agrillo of the University of Padova in Italy is quoted as saying: *'We have provided the first evidence that fish exhibit rudimentary mathematical abilities.'* The article comments that *'A variety of animals, including pigeons, raccoons, ferrets, rats, monkeys and apes have been shown to manage a selection of mathematical tasks, including counting, adding or subtracting numbers'.* It is suggested that the numerical ability of the counting fish is on a par with that of monkeys, dolphins and children aged between six and twelve months.

If complexity, including movement, is indeed the key it suggests that the creation of inorganic consciousness might be possible. On this topic, Paul Davies tells us that some computer scientists think our technology may be on the verge of achieving thinking machines.

There would seem to be no theoretical barrier to the fulfilment of this prognostication but it is sure that any 'thinking machine' would have to be mind-bogglingly intricate. The likelihood is that it would have to incorporate some quasi-organic components in order to reach the requisite level of complexity. It would probably also have to have many dynamic components and not just a static array of intricate circuitry.

3. Physical to Mental Connections

No doubt if such a machine is possible it could be designed to experience, for example, pain. It (she/he?) might be given the wherewithal to learn that putting a sense-pad on to a hot object produces an unpleasant mental event. Would it not be true of such a machine, then, to say that the physical chain of events 'caused' the feeling of pain?

The answer is an emphatic negative. The causal chain produces the complex pattern of neural firing, an event which, in the nature of things, cannot take place without occasioning a sensation. But one does not *cause* the other; the two aspects are symbiotically associated.

The morphological basis of the relationship between the objective and the subjective can perhaps be illustrated by the following analogy.

Physical forces bring together a collection of molecules which appear to us, for example, as carbon or oxygen. This process of *construction* is clearly causal but it would not be correct to say that the molecular configuration is *itself* causal. A particular arrangement of

molecules does not *cause* carbon to be, it *is* carbon. The atomic structure and the 'personality' of a substance are one and the same.

To take this just a little further; if a scientist were asked to show the causal process which makes one array of molecules be carbon and a different array be oxygen the request would seem to be meaningless. There is no step between completing the jig-saw and the appearance of the completed picture. The arrays and the properties just *are* that way.

A homely example might make the relationship clearer.

Give someone three sticks of equal length and ask them to create a triangle. As the last stick is slotted into place, the triangle comes into existence. The person who placed the last stick indubitably caused the triangle to exist but the sticks themselves cannot be said to cause the triangle; they *are* the triangle.

4. Mental to Physical Connections

With something like a heat/pain event, the process from nerve activation to brain reaction and thus the simultaneous correlated mental event is, at least in principle, clear. But we self-conscious beings *think*. Might this not imply an inversion of the process? That is, there could, or indeed rather *should*, be brain events which have no physical antecedents. In other words, there might be brain activity which seems, from a physical point of view, just to occur.

Once again, it will not be the case that the mental activity *causes* the 'spontaneous' firing of neurons. The fact of thinking *irrevocably entails* the brain events. These brain events will surely then have further consequences which are brought about by physical processes and these processes may or may not be at a level which triggers conscious events.

There is evidence to suggest that there are such apparently uncaused brain events.

In a 2007 New Scientist article[92] Roxanne Khamsi notes that, from the mid-1990s onwards, scans have revealed variable brain activity that appears unrelated to external stimuli and occurs even when a person is asleep or anaesthetised.

Reporting on an experiment carried out at Washington University, Missouri,. Khamsi tells us that the researchers (Michael Fox and colleagues) found that:

'…fluctuations in brain activity caused volunteers to subconsciously exert slightly less pressure when pressing a button on cue. Crucially this activity is independent of any external stimulus and does not appear related to attention or anticipation.'

The researchers claim that it is *'…the first direct evidence that internal instabilities – so called "spontaneous brain activity" – may play an important role in the variability of human behaviour.'*

In the same article, Rasmus Birn of the Maryland National Institute of Health, is quoted as saying

'This is the first clear evidence that (spontaneous brain activity) *has some behavioural significance'.* He adds; *'…it remains to be seen whether this result holds for more complex cognitive tasks or other brain regions or networks'.*

For the present purposes, the intricacies are not especially important. The key information is that practitioners are easy with the notion that some brain events seem to have no physical causes. Some might be tempted to tidy these happenings away under the 'random events' cloak (of which more in the next chapter) but it is here suggested that such manifestations are totally associated with mental activity.

Thus the hypothesis is that a person who is working on a knotty problem will manifest a firing of neurons as the process of thinking goes on and might even exhibit a neuronal 'lighting up' associated with a joyous 'Got it!' conclusion. But, just to reinforce the a-causal point, the entire mentally-originated process does not *cause* the associated neurons to fire; the thoughts and the firings are concurrent

There is, of course, an imbalance, in that there are many low-level activities in the brain which do not occasion consciousness whereas conscious events invariably have associated firings of neurons but, as already proposed, consciousness is related to complexity. The imbalance is readily understandable and it is associated with the evolutionary movement from maximum distribution of energy to maximum organization.

But if such apparently spontaneous brain activity does take place, how are we to account for the energy transaction? It is easy to see from the 'physical to mental' chain that a process takes place and we will one day doubtless be able to trace in detail the complete causal chains which trigger events which are both objective and subjective. But what of the apparently 'spontaneous' brain events? - there are no physical antecedents.

On these lines, the philosopher Daniel Dennett attempted[93] to refute the Chalmers 'two aspects' approach. He is quoted as writing:

'No physical energy or mass is associated with (the signals from the mind to the brain). How do they make a difference to what happens in the brain cells they must affect, if the mind is to have any influence over the body...?'

It's a good question

Rosenblum and Kuttner[94] deal with it in this way:

'Since Chalmers argues that consciousness obeys principles ***outside*** *standard physics it is not clear that an argument based on standard physics can be a refutation of Chalmers. Moreover there is a quantum loophole in Dennett's argument: No mass or energy is*

necessarily required to determine which of the several possible states a waveform will collapse upon observation.'

The metaphysical approach of Alphomism allows that the solution can lie outwith standard physics but it cannot be denied that we are faced with two potentially very awkward, linked, scientific problems.

Firstly, if the laws of thermo-dynamics are to be upheld, as surely they must, we need a source of energy for these 'spontaneous' events.

Secondly, if there is a mental process going on which has a physical correlate in the brain, in what medium is this process taking place?

The answer, proposed here, is that we have to allow for the existence of something which might be called 'subjective energy'.

5. Subjective Energy

It has already been noted that the physical manifestation of energy in the universe is only a small proportion of the total. Hawking's acceptance of the presence of dark matter was mentioned earlier whilst Paul Davies goes further with[95]: *'It seems that dark energy constitutes most of the mass of the universe, yet nobody knows what it is.'* And, as also noted earlier[75], there are those who claim to have identified examples of dark energy.

It has also been noted[37] that, according to some views, there is no such thing as empty space but only a 'soup' of virtual particles which seem perpetually to come into and out of observable existence.

Our brains, electrical devices all, are operating in this 'soup'. It is here proposed that one of the functions of this fizzy background is to provide a mental medium which enables consciousness.

Taken just in this context, this proposal might seem reckless but, as will emerge in the next chapter, the idea of a consciousness-related role for 'dark energy' deals neatly with some otherwise intractable problems about causation. It is, in true metaphysical fashion, a proposal which 'fits' in very many ways.

One of the ways it fits is in relation to Einstein's 'spooky interactions'. Rosenblum and Kuttner tell[96] of experiments by John Clauser to test Bell's Inequality. They write:

'The experiments showed that the properties of objects in our world have an observation-created reality ***or*** *that there exists a universal connectedness or both.'*

The connectedness is very far-reaching. Rosenblum and Kuttner[97] explain:

'In principle, however, any two objects that have ever interacted are forever entangled. The behaviour of one instantaneously influences the other. An entanglement exists even if the interaction is through each of the objects having interacted with a third object. In principle our world has a universal connectedness.'

Such a network of connectedness demands a medium. The all-pervading 'dark energy' is surely the most likely candidate.

It is proposed that the most potent image to consider at this point is of our brains as organic electro-magnetic devices functioning in an all-pervading field. They are constantly processing dark energy. The interrelationship between the evolving foci of power (our minds/brains) and the background of universal energy is perhaps the key to the understanding of consciousness.

The question arises; if there *is* this subjective ambience of energy, why can we not detect it via objective means?

Well, there is one, admittedly tenuous, possibility of providing some hard evidence in that it might be the case that as conscious activity declines, say in coma or drug-induced sleep, there could be a slight loss of body mass and hence weight.

There have, of course, been many experiments involving the weighing of people as they died. The results are extremely inconclusive as might be expected because there are so many factors. But if there *is* a physically unexpected measurable weight loss then this could be explained as the release of subjective energy as the mental processing shuts down. It is likely though that for subjects in such experiments, who will surely be people who are dying slowly, the shut-down may be very gradual and hence the weight loss widely distributed over time.

But if it transpires that there is no energy loss as the brain declines, does this mean that the idea of subjective energy should be sidelined?

Alphomism argues not, for this is where the findings of the researchers into quantum mechanics become very interesting indeed. Writing of the waveform versions of sub-atomic entities Rosenblum and Kuttner tell us[98] that;

'*… we can never 'see' the 'weird' separation states – it's just inference from interference.'*

It is surely not too big a step to suggest that just as the efforts of scientists to perceive the 'smeared' version of a fundamental entity are frustrated by instant collapse into particle form, so perhaps any attempts to objectify subjective energy could be abortive.

In other words, what is being suggested here is that, of its very nature, 'subjective energy' is not detectable through objective processes. We can never 'see' subjective energy, it's just inference from cognitive behaviour. And, quite possibly it will be found to be

weightless, as photons are. However, we will, increasingly as evolution proceeds, become *cognitively* aware of it. The term will be ultimately 'cashable' in a way which will shortly be described.

It is perhaps worth alluding once more to the Peter Coles' newspaper article[37] which tells of mysterious entities in space which 'pop into and out of existence'. It is sure that they don't *actually* cease to exist, they just become objectively undetectable. They are arguably 'sometimes subjective/sometimes objective', perhaps depending on the extent to which they are being observed.

There is very much more to be said about this interpretation of dark energy and its role in the regulation of the universe but this is to come later after some more immediate matters are explored.

6. The Subconscious

It is not by any means being suggested that there is a clear demarcation between the subjective and the objective. As with many things in Nature, there is a spectrum from one extreme to the other. Obviously there are some events (eg simple mechanical processes) in which the element of consciousness is almost vanishingly small whilst there are others (eg cognitive problem solving) which manifest very high levels of subjective awareness. But, to repeat, it is proposed that it is always the case that both elements are present.

A very interesting aspect of human consciousness is that we can to some extent control it. We have an attention-directing facility which allows us to bring particular perceptions or thoughts into focus and to relegate others. We can also choose to switch full consciousness off when, for example, we go to sleep or undergo anaesthesia.

When we sleep we usually dream, though we don't always remember the content. Generally we talk about dream experiences as though they belong in consciousness (eg 'I enjoyed that dream') but it is a peculiar kind of ownership. Some people claim to be able to control the content of their dreams but most of us cannot. We sometimes wake in stress or even terror, presumably not an outcome we would freely choose.

Sometimes our dreams act as a link between the physical and the mental. A familiar example is dreaming about the need to urinate. Often we wake and recognize the need consciously. The physiological prompt must activate a consciousness-generating location or pattern of brain cells. Once awake, we can then have an internal debate as to whether to get up and satisfy the need or not

The implication is that there is a layer of mental activity which is only sporadically in our control. And there is evidence that often it pays to allow the subconscious to work on problems which our conscious selves find difficult. Alluding to research along these lines Professor Richard Wiseman is quoted in a Guardian article[99], as saying; *'…to fully reap the rewards of a creative mind people's brains need to be primed for a new way of thinking.'*

Along these lines, there is evidence that our best ideas occur when we are close to sleep. In another newspaper article[100], Dr. Schwartz of the University of Geneva tells of experiments relating to problem solving and sleep. Groups of subjects were set tasks and then some were allowed to sleep, the others not. Brain scans showed that: *'..a period of sleep following a new experience can consolidate and improve subsequent effects of learning from the experience'.* Some highly localised brain changes were identified.

It seems, from such research and from personal experience, that the optimum way to think creatively is to prime the process with a certain amount of conscious direction but then to allow the sub-conscious to take over.

If the subconscious is, as it seems, processing data and coming to new conclusions which can then be consciously accessed then there is a question as to where the data comes from. It is of little use to say that people simply 'have ideas'; we need to know where ideas originate.

In the early version of Alphomism it was suggested that the source might be in the inherited DNA which could conceivably contain fragmented information from Alphoma which the unconscious 'puts together'. This may be so but there is also a strong possibility that the fragmented information is held in dark energy. The two possible sources are, of course, not mutually exclusive. It seems sure, however, that whether it is one of these or both, the brain is at its most efficient at retrieving data when we relax a little and stop trying too hard.

This raises the further question as to what the brain activity associated with subconscious activity will look like. On this there can only be 'best guessing' but the likelihood is that the neuroscientist will be able to predict neuronal activity to some extent but there will be some processes which, from a purely objective point of view, seem to be 'random'.

Another way of expressing this is that probably we don't need to be *actually* conscious of activity for it to seem to be associated with physically unpredictable brain events. Subconscious workings will, it is proposed, be a mixture of the operation of physical and mental forces.

In the initial summary of Alphomism the view was expressed that anything which has been believed by a large number of people for a long time almost certainly contains significant degrees of truth. This, it is here suggested, happens because in our different ways and cultures we are all accessing the same stock of information through largely sub-conscious processes.

There are, of course, very strong resonances to this 'detached' interpretation of mental processes in many Eastern philosophies and in all forms of mysticism.

One very interesting aspect of the subconscious is the nature of identity. As 'scientific', determinist-minded beings we are encouraged to think of ourselves as unitary entities.

The term 'I' is used to denote a singular personality and anyone who diverges from this norm is usually considered to the mentally ill, with the label 'schizophrenic' comfortingly applied. Yet many of the supposedly sane 'talk to themselves' and it is very common for people to think in plural terms. 'Shall *we* do so-and-so?' is perhaps just as common an individual thought as the singular version.

It could be that the defined identity is just a device, albeit one which surely has been essential for human survival. But perhaps we can begin to relax a little and to allow ourselves, when in safe circumstances, to acknowledge that we are bundles rather than totally homogenous entities.

7. Animism

An objection which might be levelled at the idea of a universal subjective element to energy is that it could be seen to sanction ludicrous versions of animism. The idea that basic objects such as tables and chairs have a subjective element associated with them might seem ridiculous, even allowing the caveat that the subjective effect is almost vanishingly small. The intention of this subsection is to suggest that animistic beliefs are not quite as absurd as sometimes suggested.

There is a very strong human tradition of investing objects with personality.

John Nichol, writing[101] about Thomas Campanella, a 'predecessor of Bacon' who published a seminal work in 1590, tells us that he believed that; *'All created things… are sensible, else the world would be in a chaos.'* Nichol adds that *'…according to Campanella, space and matter are the warp and woof of the "all wise and good" '.*

The greatly respected philosopher John Locke was another who gave credence to the notion that objects have something akin to our will and in The Golden Bough, Frazer tells us that *'To the savage, the world in general is animate'*. Further, in a review of a book by Jeremy Narby it is claimed[102] that: *'Nature, to shamans, is conscious or "minded", an idea unpopular to many western scientists.'*

And of course, belief in animism is not just a historic phenomenon. Many modern people, mostly the male of the species, are in love with their motor cars and provide them with affectionate names. Ships are generally female. Machines are talked to as though animate. The sea has personality, craftspeople form bonds with their tools and products and often treat them as though they were sensate; there are very many examples.

With repeated qualifications about the small scale of the effect, Alphomism suggests that there is a basis for such intuitions. An object as mundane as a table is, beneath the prosaic surface, a whirring, seething blur of molecular activity. There is energy whizzing and buzzing. It is not impossible that it has an imperceptible 'halo', a rudimentary 'personality'.

It has been mooted that there are two factors which increase the subjective effect; form and movement. As far as form is concerned, it follows that an item of furniture has a greater 'subjective potency' than the pile of wood from which it was made. Very likely, the effort put into it by designers and craftspeople contribute to this increase just as, according to many scientists, consciousness plays its part in the behaviour of atomic entities. Once movement is introduced, in the form of machines, the subjective aspect increases even further.

In support of the animist argument, there is evidence that mental states can influence the material world. Writing about what are known as Random Event Generator (REG) experiments, R. G. Jahn et al, tell us[103] that:

'…over the period 1959 to 1987, some 832 experimental studies conducted by 68 investigators directly addressed the influence of human attention on the performance of a broad variety of random event generators. Meta-analytical assessment[n14] of these results yields strong statistical evidence for small but consistent anomalous effects that correlate with the intentions or desires of their operators…'

A year later the same team advised us[104] that:

'Earlier experimental evidence for direct influence of individual intention on the statistical distributions of physical random events has been documented in numerous research articles and meta-analyses….While the effects in these experiments are statistically robust, they resist explanation via canonical scientific models, and have led us to propose broader interpretations that explicitly acknowledge the involvement of subjective aspects of consciousness in objective physical processes (Jahn & Dunne, 1997)'

They add:

'Any attempts to model phenomena like those reported here must be immensely complicated by the evidence that human volition is the primary correlate of the observed anomalous physical effects, and thus some proactive role for consciousness must somehow be represented.' [n15]

On a somewhat more esoteric note, there is a claim[105] by a Japanese researcher, Masaru Emoto, that the shape of ice crystals can be influenced by mental input as they are forming, There are striking pictures of crystals which are allegedly influenced by different types of *'chi'*. The positive values of peace, love and so forth produce subjectively 'prettier' shapes than do the destructive influences.

There could perhaps be even more wide ranging tests of this modern version of animism. Is it the case, for example, allowing for the same level of maintenance, that a machine which is treasured by its owner is more reliable than one which is emotionally disregarded?

There is, however, a possible procedural problem with conducting objective experiments into subjective phenomena, It is quite likely that the introduction of objectivity inhibits the subjective process[n16]. Of this more will be said later.

There are at least two further reasons for giving the qualified animist approach some credence.

Firstly, if it is in any way true, it explains why so many billions of people feel attracted, in weak or strong measure, to forms of animism. This explanatory power is surely a bonus not lightly to be dismissed.

Secondly it can give some account as to why people are so attracted to 'original' objects when, from an objective point of view, copies seem just as good and sometimes, in some respects, 'better'. Maybe the interaction between the creator and the original materials is, so to speak, 'recorded' (entangled?) by the object. And this, perhaps, is why people cling to possessions of departed loved ones; there may just be a sub-consciously perceptible imprint which provides a small degree of comfort, a faint contact with the departed.

Subject to the reservation about the difficulty associated with the objective testing of subjective phenomena this latter possibility might be amenable to experiment. Subjects could be asked to handle artifacts which they do not consciously recognize but some of which might be expected to have resonance for them. Measurement of significant somatic indicators may perhaps indicate a degree of 'recognition' and thus provide us with objective evidence that such a phenomenon exists.

8. Subjective Reality

The rules as to what counts as definitive evidence of objective truth are reasonably clear. Objects and phenomena which can be consistently perceived are held to exist. Reliable repetition is the key factor. Generally speaking we construct a picture of our world which allows us confidently to expect that, for example, the beautiful willow tree in the park will be there whenever we choose to see, touch, smell or hear it.

There are those, of course, including the famous Bishop Berkeley, who question the continued existence of unobserved objects but it is worth recalling Bohr's view that the concern about what 'really' exists is not sensible. The fact is that the assumption of continued existence is the simplest theory. It works. This is 'what we can say' about this aspect of Nature. Anyone promulgating the idea that objects cease to exist when unobserved has to provide an account as to how they spring back into existence so reliably.

They also have to explain the *effects* of objects. For example, the grass beneath the tree might not grow so well because of being shaded and because the tree takes most of the water. How desperately complicated would any theory be which set out to sustain science whilst assuming discontinuous existence! An ice cube left in a warm room melts and leaves a pool of water. What simpler than to allow for processes which continue when we

are not watching? There is no point in asking a supposedly deeper question about reality; this *is* reality. This is one of the many areas of thought where a search for some kind of absolute account is counter-productive. The *idea* of persistent existence is all we need.

Subjective events are very different. There is no reliable continuity. What, therefore, might be the status of statements in the realm of the subjective?

Some statements are purely self-report. An example is; 'I feel pain'. A neuroscientist, observing brain processes, might sometimes doubt such a claim if it seems that the relevant neurons are inactive but, under such circumstances, all the researcher can do is suggest that the subject might be lying or, in some odd way, mistaken.

Obviously we have no way of sharing with each other the qualitative nature of our feelings. It makes no sense to try to compare one person's idea of pain with another's. All we know is the range of reaction to hurt, and other feelings, and the associated brain activity. If someone says that they are in pain then, based on our own direct experience of the sensation, we make certain assumptions and perhaps predictions as to what the person might do.

The 'incontrovertible' category is not limited to statements about feelings. 'I seem to see a living dinosaur' cannot be gainsaid. The claimant might be speaking figuratively or perhaps have an especially vivid imagination, or be under the influence of hallucinogenic drugs but for as long as it is not being averred that 'There really is a living dinosaur' then the statement is unchallengeable.

Probably we will develop knowledge of brain processes to the point where the neuroscientist *could* express strong doubts about 'I seem' statements but there can never be total rejection of individual assertions and anyway it is hard to imagine circumstances, save perhaps when treating damaging mental malfunction, where we might want to do so.

But there are, of course, some subjective statements which have potentially objective consequences. For example, many people claim to hear the voice of god. If *everybody* heard what seemed to be the same voice then, even if there was no objective evidence to back the claims, it might make sense to agree that an essentially subjective experience has a measure of objective validity.

There are, however, many supposed gods and no prospect of unanimity even within one sector of the faithful. There are also very many people who have no experience of communication from a deity. Religionists might claim, though, that faith is a pre-condition for experiencing god. The mind has to be tuned in order to get divine reception.

A difficulty with this approach, however, is that it is probably self-validating. A properly controlled study[106] proved that people with strong spiritual beliefs recover more rapidly from bereavement than those without. Some believers would doubtless claim that it is the help of their veridical god which brings about the more rapid recovery but the

improvement could be a result of the believers 'knowing' that there is life after death and thus that the loss is temporary

The notion that it is, in fact, internal processes which are effective is supported by an experiment, for which alas the reference has been mislaid, which showed that patients with pleasant views out of hospital windows recover more rapidly than those with grim outlooks.

This suggests that humans are capable not only of using one mental process to control another but also of harnessing mental power to influence physical processes. This very interesting possibility is considered in the next section.

9. Mind over Matter

There is a broad range of subjective experiences which allegedly inter-relate with our physical selves and the outside world and which therefore should be amenable to testing. Perhaps the two most obvious 'mind over matter' categories are telepathy and psycho-kinesis.

It is sometimes claimed, for example, that early humans could communicate over long distances without any aids. A modern anecdotal example is provided by someone who was generally sceptical about what might be called psychic phenomena. He was utterly alone at a remote desert crossroads whilst hitch-hiking in Libya and 'heard' his sister's voice very clearly making a cry of distress. It could, he readily admits, have been an hallucination, especially given the fierce heat, but the experience was so strong that he wrote a note about it in his journey log. He returned home weeks later to find that his relative had indeed been under acute stress at that precise time.

Perhaps it is possible, given the peculiarities thrown up by quantum mechanics and the suggestion made earlier that dark energy is a mental membrane, that so-called psychic phenomena are real. After all, scientists suggest these days that objects need conscious intervention in order to move from their 'superposition' states to the particle version of reality. And, the Random Events Generator experiments mentioned earlier suggest subtle forms of communication. Why should this blurring of the lines not also apply to interaction between humans?

But if this is the case, why are the phenomena not more reliable? There are very many people who claim to have had what might broadly be called 'psychic experiences' but attempts to replicate these under laboratory conditions are generally not successful.

The Alphomist contention is that the failure to replicate does not mean that all those who claim to have had psychic experiences are fooling themselves for the following point, made earlier but worthy of repetition, has to be taken into consideration

It is a very reasonable claim that any attempt to objectify subjective phenomena might inhibit the process such investigations are trying to demonstrate.

The argument in support of this is that we modern humans have evolved largely as objectivists. That is, those of our ancestors who thought on 'hard' lines were the ones who survived. This reference to 'hardness' is intended to cover both science and religion, for the rigid structure in the Dark Ages was unquestionable faith. Whether through theological dogma or belief in total objectivity, the ability to take in 'out of the box' ideas was, it is suggested, attenuated.

The more introspective people, perhaps the Australian aboriginals and the Arawaks in the Caribbean, who favoured a more open-minded approach, were wiped out or at least over-powered and gradually 'trained' into rigid ways of thought..

It could be argued, therefore, that our receptivity to mental interaction has been diminished via breeding and training. It could be, though, that we still have capabilities but that our heads are so busy with practicalities that our mental receiving apparatus has no chance of overcoming all the internal 'noise'.

It is interesting in this connection that those rare beings in human history who wanted to explore the inner powers, that is the mystics, almost invariably took themselves to remote places and lived on very little. By shutting down the objective aspects of their being they opened themselves up for processing the fragments of information derived from the soupy background.

Goswami is so impressed with the mystical process that he proposes[107] that it offers experiential proof of monistic idealism. It will no doubt be evident that Alphomism does not embrace this particular conclusion but it is maintained that we should treat the findings of the mystics with the utmost respect. The activation of otherwise inhibited receptors can, it is suggested, provide fascinating outcomes.

This is perhaps what, inadvertently, happened with the Libyan hitch-hiker mentioned above. Weeks spent just getting from one place to another with none of the usual life distraction perhaps freed the mind. Had that person been living the home routine then probably the communication would not have been possible.

If it is accepted that we are at a very early stage of the evolution of consciousness then it could be argued that even our most powerful introspectives are operating at the lower end of what might be possible. Maybe at some point, when technology is guaranteeing a high degree of safety, we might shift the emphasis of education so that some people focus largely on mystical techniques. Probably by that time we will be able to boost interior power via the use of super, perhaps organic, computers. If it is true that the rules governing mental interactions are quantum-like, that is, that instant communication over distance is possible, then our first contact with other intelligence in the universe might be via a meeting of minds rather than the voyages of spacecraft.

10. Overview

It has been argued that the place of 'subjectivity' in the scheme of things goes far beyond parallelism and epiphenomena. It is not simply a matter of including a mind/body explanation but rather that this relationship is *central* to the explanation of the universal process. And because the subjective and objective are entirely different categories, science cannot bridge the gap between them.

Chapter 4: Time

The last of the three blocks to the provision of a completely scientific account of the universe is considered in this section. The chapter has been entitled 'time' because the difficulty concerns causation, which is fundamentally to do with the operation of discontinuous energy in space. This, it will perhaps be recalled, is the Alphomist definition of time.

The chapter begins with a defence of the earlier claim that time is an abstract notion. Thereafter, the three difficulties for traditional science in relation to causation are considered. To reiterate, these are;

- First cause (the eternity conundrum – where does *everything* come from?)
- Laws of Nature (where do they come from and how are they sustained?)
- Randomness (what causes random events?)

1. The Nature of Time

In classical science, space and time were for the most part thought of as completely separate entities. Time was perceived as a constant thing in the sense that a clock would tick reliably away wherever it was in the universe and however fast it was moving.

We now know that clocks are dependent on the speed at which they are travelling and the strength of the gravitational field around them. If two timing devices are synchronised precisely on Earth and one is sent into space on a satellite, then the one high above us will run slower than the one left behind.

In other words, *as far as our clocks are concerned*, there is no absolute time. For this reason scientists have found it logistically convenient to think of time as a fourth dimension. In the intricate calculations needed to direct rockets accurately and to locate satellites, the space-time continuum model has proved to be of great efficacy.

Hawking asserts[108] that: *'We must accept that time is not completely separate from and independent of space but is combined with it to form an object called space-time'*

A page later[109] he suggests that: *'It is often helpful to think of the four coordinates of an event as specifying its position in a four dimensional space called space-time. It is impossible to imagine a four dimensional space.'*

It is perhaps odd that a 'helpful' device is unimaginable but there can be no doubt that the mathematics work wonderfully well. However, the Alphomist claim is that, as with 'infinity', the computational success has produced some misleading statements about the operation of time.

The received opinion seems to be that because clocks in spacecraft slow down then, somehow, 'time' has slowed. This implies that time is a thing in itself, perhaps a form of energy or a stream of nebulousness which has currents and maybe local eddies. Alphomism suggests that this is a misconception. As stated earlier, time is an abstraction from processes. We can use any number of these to derive a measure of time; Earth years, Jupiter years, pulses of radiation and an indefinite number of others. They can all be related to each other. After all, a clock is only a measuring device. A hot steel ruler will give a different result as compared to a cooler one assuming that the size of the (unheated) measured object doesn't change.

The idea that time is a variable stream separate from these processes is sometimes expressed in the so-called 'twins paradox'. It is held that if one twin stayed on Earth and the other travelled at high velocity into space, with onboard clocks predictably slowing, the journeying twin would age less than the stay-at-home one. When the voyager returned she would find her sister looking ancient whilst she was still in the bloom of youth.

Well, one thing the Earth-based twin could do would be to take advantage of ever-improving remedies against ageing. She might be able to greet her sibling with a totally unlined face. Both would have been through the same number of both Earth years and space-traveller years and the returning one could joke that she's only twenty three in space years but the longevity of the twins would be identical.

But further, and more importantly, what guarantee is there that the ageing process will be slowed by space travel? It *might* be but it might, without preventative treatment, instead be accelerated. The Earthbound one could outlive the wanderer.

It has been suggested (*pers comm*) that if the twins have some activity, for example novel-reading, at which on Earth they operate at more or less the same rate then the light-speed traveller would have read fewer novels by the time she returns home. But we don't know what the effect of rapid travel would be on reading speed. It could be that a near-light-speed traveller who normally reads a novel a week on Earth will find that she can read three per week or more in the hurtling spaceship.

These relative aspects are hard to grasp and perhaps a helpful way of conceptualising time is to consider the whole span of Nature. Alphomism holds that there is a small amount of discontinuity related to the Alphoma phase, and thus a residual time element, but that time began in earnest with the Big Bang and the start of the Nature phase. This phase will come to an end, either with re-integration as Alphomism predicts or, if Alphomism is wrong, with a final 'phut' as the last fragment of available energy enters the unimaginable entropic soup.

Between the explosion and the resolution is a fixed amount of time. Time, like space and energy, is finite. If Alphomism is correct we will eventually be able to quantify the amount in whatever measure proves to be the most convenient. This figure will be convertible into any other measure. Maybe there's, say, forty billion Earth years-worth of time. That's it. There's no flow, just a fixed quantity.

If there could be a reference point 'outside' the universe it would perhaps be possible to speak of the entire universal process speeding up or slowing down but there cannot be such a benchmark.

Obviously, *within* the universe, some processes change speed relative to others. We could imagine our solar system going faster. Such a hastening may or may not change life expectancy. Using some distant aspect of the universe as the yardstick we could keep a check on the relationship between 'old time' and 'new time' but maybe a change, provided it was not extreme, would not make much difference to the experience of our lives. Living to two hundred (new) years of age might be commonplace but it might be equivalent to only ninety in the previous conditions

Thus Alphomism rejects the claim that space and time combine to create an 'object'. As has been noted, they are not 'things' which can interact but abstractions. Furthermore, they are intrinsically different. Space is continuous whereas time depends upon discontinuity. The conceptual attempt to combine space and time is akin to the running together of the waveform and the particle. As Rosenblum and Kuttner advised[87], these two are complementary but they have to be treated separately.

Of course, it is a commonplace that time *seems* to vary. We say things such as: 'that was the longest day of my life' and 'that hour went quickly' yet we know that objective time has not changed. An apparently long dream can 'explain' a noise that wakes us up.

Hawking writes about the prediction that time should appear to run slower near a massive body. He tells us[110] that:

'This is because there is a relation between the energy of light and its frequency…the greater the energy the higher the frequency. As light travels upwards in the earth's gravitational field it loses energy, and so its frequency goes down…To someone high up it would appear that everything down below was taking longer to happen'

But this is a purely perceptual phenomenon. We see slow motion images on the cinema screen yet we are clear that the reality was different.

To reiterate an important point: The difficulty is not with the mismatch of subjective and objective, it stems from the claim that objective time can vary in pace. This is another of those puzzling proposals with an oxymoronic ring. What can 'the speed of time' mean?

We adjust time all the time. Long-distance travellers are forever having to re-set their watches. The day clicks over at the international date line. Many people in the middle ages, at the time of the switch to the Gregorian calendar with its creation of leap years, were sure that they were being robbed of days of their life but of course the adjustment to the recording of time had no physical affects whatsoever.

If there could be a clock on Jupiter it would probably tick away very slowly. It might be possible for someone on a huge habitable planet, despite the massive gravity, to run one hundred Earth yards in ten of the planet's seconds but only (probably) because of the ponderousness of the clock.

It follows, from the Alphomist position, that ideas of time warps, worm holes, reverse causation and time travel are best kept in the realm of science fiction. It is sure that eventually we will be able to *perceive* all of the universe's history but is another oxymoron to suggest that we can change it; history is history. If our successors had been there, they would be part of history. Further, the future is as yet un-determined. The system works out overall but the detail is yet to be filled in. There are no 'future beings' to come into our current world.

Time travel, to the past or into the future, is a logical nonsense because, as already expressed more than once, time is not a material thing; it is an abstraction.

2. First Cause

Writing of the origins of the material universe, Paul Davies asks[111]:

'Why should a ball of matter suddenly appear out of nowhere, at some particular moment in time and in some particular location in pre-existing empty space, when this event hasn't happened for all eternity up to that moment?.....There is no satisfactory answer'.

It will be evident from the foregoing pages that Alphomism has logical and conceptual difficulties with the formulation of Davies's question. What do 'nowhere' and 'eternity' mean? How can there be a 'moment in time' in 'pre-existing empty space'?

But surely the most fundamental 'first cause' question cannot even take 'pre-existing empty space' for granted. For one thing, there is doubt as to whether there ever could be 'empty space' but more importantly the explanation *cannot* just begin with the Big Bang. Even if we satisfy ourselves on the space question we have to ask about the provenance of the materials for the explosion.

A few pages later[112] Davies is asserting that, if we assume that time began with the Big Bang, we can dispense with the tricky 'what before?' question. He does acknowledge that people sometimes feel cheated by this but by way of consolation he quotes the idea proposed by St. Augustine that *'....the world was made with time and not in time.'*

Because Alphomism holds that time is purely an abstraction, it asserts that it cannot be used to make *anything* let alone the entire universe.

In the face of the obvious difficulties, Alphomism begins to address the question of the origins of 'everything' by claiming that:

- the universe is of finite size and
- other than the universe there is nothing.

The logical outcome of this is that, in order to provide an explanation as to where *everything* comes from, we have to start with nothing. But there is a palpable difficulty with this which Lucretius[113] expressed succinctly in the form: *'Nothing can come out of nothing'*.

A few centuries further on, John Locke[114], in his somewhat more flamboyant fashion, declared that:

'I have never yet heard of anyone so unreasonable or that could suppose so manifest a contradiction, as a time wherein there was perfectly nothing; this being of all absurdities the greatest to imagine that pure nothing, the perfect negation and absence of all beings, should ever produce any real existence.'

Locke puts the Alphomist position precisely. 'Nothing' is not a thing; it is an absence of thing. It is an instruction to cease imagining.

It is manifest that we cannot form a creational theory if we begin with an injunction not to think. The only possible outcome is that the universe *just has to be taken as granted*.

There is a risk that people will find this as much of a 'cheat' as Davies' 'back stop' of the Big Bang but there is a very considerable difference between the stances. A closed loop process which 'makes sense' is surely vastly superior to a linear account with a very uncertain beginning and a totally imponderable end.

Of course there are millions who try to avoid such negative feelings by asserting that a god of one description or another created the universe but this is simply to cover the problem with a carpet of mystery. The existence of god has inevitably to be taken for granted and the supposed supreme being has to be given impossible attributes such as omnipotence, eternal existence and infinite extent. The nagging 'whence god?' question is usually answered by saying that that god 'is, was, and always will be'. But this is no

different from the simpler existential declaration that the *universe* 'is, was and always will be'.

Being true to Occam's injunction we might just as well draw the line at one conundrum rather than creating a whole lot more.

In more modern times, Wittgenstein was surely advocating such a stance when he wrote[115]; *'The world is all that is the case.'* Those who call themselves existentialists doubtless agree.

And in our own times Stephen Hawking[116] seems to be on the same track for at least some of the time. After a speculative passage about infinity and imaginary time, he suggests that:

'The universe would be completely self-contained and not affected by anything else. It would be neither created nor destroyed. It would just BE.'

There are some philosophers, sometimes called Mysterians, who abandon ship in the face of what seem to be intractable problems. Some members of the 'it's beyond our feeble powers' school hypothesise that we relate to the universe as animals relate to us. The implication is that there is a higher level of thought and language that we will never access.

Taking things further, some resort, as noted earlier, to an analogy related to dimensions. In support of this model we are asked to imagine a completely flat world in which the inhabitants have no notion of three-dimensionality. But of course there could not be a *completely* flat creature; even the marks which we make on paper have thickness. The idea of us being plucked into a fourth (or fifth depending one one's attitude to time) dimension is actually inconceivable.

For this reason Alphomism rejects the mysterious approach and argues that it is far preferable to accept the logic than to resort to esoteric invention. There cannot be a linear explanation of the origin of the entire universe therefore we have to accept existence and then formulate the most efficient account of a self-sustaining, contained process that we can muster.

And, as suggested above, this account, even though not in the linear tradition, can go a long way to ameliorating the angst of being denied a beginning and an end. It happens that we are currently 'in time', all our our scientific success is rooted in temporality. But many people have experienced, and written about, what are oxymoronically called 'timeless moments'. Mystics, people deep into artistic enjoyment or those rapt in love have told of experiences which, though clearly in time objectively, seem to defy the temporal rules. Those lucky, or dedicated, enough to have had such insights have the chance to understand that our Nature-based experience of time is not the whole of the story. In timeless Alphoma the burning thirst to find a first cause will be totally assuaged.

From the Alphoman perspective we will see a pattern as well as a process; the two being totally interdependent as are particle and wave. It will be evident from the chart of universal history that emerging self-conscious beings use will-power to fuel and guide the universal journey. It will be satisfyingly apparent that, in a very clear sense, we invent ourselves.

We can thus perhaps begin to revise our self-image, for we are not pawns in a cruel game nor helpless victims but embryonic gods whose understanding and will-power ensures existence. And whilst, at our relatively primitive stage of evolution, it is nigh on impossible to imagine what the apotheosis will be like, our curiosity will at last be satisfied when the final pieces of the jig-saw are slotted into place.

It might seem that this recourse to circularity would be anathema to all scientists but this is not so. Considering John Wheeler's speculation about predicted expansion of the realm of consciousness in the universe, Paul Davies writes[117]

'So there is a logical as well as a temporal loop here. Conventional science assumes a linear logical sequence: cosmos → life→ mind. Wheeler suggested closing this chain into a loop: cosmos → life → mind → cosmos.'

A page later he adds:

'If the universe were to become saturated by mind, then it would fulfil the necessary conditions for Wheeler's participatory principle, in which the ***entire universe*** *would be brought within the scope of observer-participancy. The final state of the universe, infused with mind, would have the power to bring into being the pathways of evolution that lead to that same final state. In this way the universe could both create itself and steer itself towards its destiny. "The coming explosion of life opens the door" declared Wheeler "to an all-encompassing role for observer-participancy: to build, in time to come, no minor part of what we call* ***its*** *past –* ***our*** *past, present and future – but this whole vast world" .'*

Wheeler's own expression of the loop is[118]: *'Physics gives rise to observer-participancy; observer-participancy gives rise to information; information gives rise to physics.'*

This seems perhaps too abstract to be entirely satisfying but it strongly suggests that a very eminent scientist was propagating the idea of a closed explicatory system. 'Physics' can perhaps be taken to refer to the post Big Bang creation of Nature, whilst 'observer-participancy suggests the evolution towards consciousness. On this second part of the loop Davies says[119]

'We can certainly imagine…that over the countless aeons that lie ahead, life and mind will spread out into the cosmos…A progressively larger fraction of the universe will be brought under intelligent control.'

Davies makes the obvious but seminal point[120] that consciousness is a *product* of evolution and that therefore the idea of it having influence in the past is tricky but he suggests that the universe might have *'…engineered its own self awareness, through quantum backward causation or some other physical mechanism yet to be discovered.'*

From what has been written above, it will be evident that Alphomism rejects the puzzling 'backward causation' formulation. The ensuing sections, on the laws of nature and 'randomness', will show how the two-tier Alphomist formulation can save us from the alarming prospect of such an intellectually awkward notion.

The model about to be proposed will also deal with another potential difficulty which is raised by the self-styled 'monist idealist' Amit Goswami. In discussing the question of the need for 'observer-participancy' for anything to exist[121] he asks the *'truly cosmological question'* namely; *'How has the cosmos existed for the past fifteen billion years if for the bulk of this time there were no conscious observers to do any collapsing of wave functions?'*

He says that the answer is *'very simple'* ie:

'The cosmos never appeared in concrete form and never stays fixed in form…I propose that the universe exists as a formless potential in myriad possible branches in the transcendent domain and becomes manifest only when observed by conscious beings.'

Simplicity isn't the attribute which springs most readily to mind in relation to this version of the multiverse approach which, as already pointed out, brings not a few difficulties in its wake. But if this approach is rejected, the key question posed by Goswami remains. If it is the case that no material object can exist without 'observer-participancy' how can it be that we are so convinced that there were material things prior to the emergence of consciousness?

The Alphomist answer to this crucial question is given in the last section of this chapter.

3. Natural Laws

The first task, however, is to explain the origin of natural laws and the power which sustains them. As Davies expresses it[122]:

'The existence of the laws of nature…is the starting point of science…But… we encounter an obvious and profound enigma: Where do the laws of nature come from?

As a start, the reader is asked to accept that the universe 'just is' and that it operates in a closed loop with the totally integrated Alphoma exploding into the Nature phase which leads to the precise re-creation of Alphoma.

To recap further, the reasons that the Nature phase is necessary are that:

- It allows the generation of 'opposites' (light/dark, creation/destruction etc) without which there can be no meaning, indeed, no existence

- It allows the emergence of free will – the ultimate driving power of the universe, the only force which we understand at a primary level, that is, from our purely subjective experience of it.

It is maintained that in Alphoma the state of knowledge and the ways of thinking will be immeasurably advanced from where we are now but it will do no harm to express things in the style and language of our time. We can have but the faintest ideas as to how individuality and collectiveness will work out but, for the sake of exposition, please imagine along these human lines.

Alphoma is a vast sphere of consciousness in which we all can experience anything we choose to experience but it is sustained by a residual nucleus of material energy. Alphoma is timeless but we inhabitants know that without the process of Nature we cannot exist.

Let us suppose, in science-fiction terms perhaps, that a team of scientists is charged with the responsibility, through a process of materialisation, of stepping into time. They take with them all the knowledge of the universe save for its detailed history. Their task is to design a system which will blow Alphoma to smithereens and then guarantee that ultimately it will be reassembled. However, the system has to generate will-power, so it cannot be rigidly controlled.

The team members are not afraid as they step outside timelessness, because they know that their timeless personae logically cannot cease to exist. They know also that, although the precious Alphoman ball has to be shattered in order to be built/re-built, they have the means to guarantee the outcome.

They decide that although there has to be a considerable degree of freedom there will be an initial need for a high degree of control. They do their calculations and discover that in fact only 4% of the energy locked up in Alphoma needs to be 'materialised'. The rest they can use to power the laws.

The fundamental force of the universe being will-power, they agree that they will have to create a *residual conscious entity* which will be physically invisible to the emerging conscious beings. It will not be an all-powerful god but a regulator. They design things such that after the mad explosion there will instantly be a mass of dark energy which will be the basis for the existence of the conscious being which will power the laws.

The Alphomist hypothesis is, therefore, that the laws of nature are designed by our Alphoman selves and are constantly enforced by the residual will which has its being in the dark energy of the universe.[n17]

The design team know, however, that the natural laws cannot be all-encompassing, for in a totally determined universe the essential free will could not emerge. They need an element which allows freedom but which is suitably guarded such that, despite the licence, there is certainty that the outcome, that is, the reconstruction of Alphoma, will take place.

To achieve this they create an envelope of randomness.

4. Randomness

It was argued earlier that we often use the word 'random' to cover processes which we know to have discoverable causal underpinnings. The Alphomist assertion that all happenings are caused might suggest that there can be no deeper meaning for the word 'random' but this is not the case.

Some causal agents are objective and some subjective and it is in the latter category that true randomness is possible. It is proposed that human beings can generate random sequences through the use of will power.

Suppose subjects in an experiment are asked to write down, as freely as possible, a random sequence of numbers. It is suggested that the lists would be very largely unpredictable by psychology or neuroscience. The qualifier 'very largely' is used because there might well be some elements of habit, and association which might allow a degree of predictive success. Nonetheless it is suggested that sophisticated brain scanners would show what would seem like spontaneous firings of neurons as the number-generation progressed.

In a way which might seem a shade paradoxical, it is the cause known as will-power which generates randomness. And it is the deployment of this type of true randomness which allows free will.

This allows both creative and destructive happenings which can be brought under control by conscious beings as they emerge. The willed randomness is, of course, kept within limits. Overall, the system must deliver.

Thus, Alphomism proposes that there are 'corrective influences' exercised by the residual will. These are not specific to individuals, for this would be inhibitory to the emergence of will-power, but they keep the ship of Nature broadly on course.

Thus those who say that 'there's a tide in the affairs of men' speak the truth. There is good and bad luck; it all depends where we are as individuals in the tossing sea of fortune.

The question arises as to how the residual consciousness exerts its influence in the physical sector and it seems highly likely that it does so via the manipulation of energy at a quantum level.

An interesting aspect of all this is that the system of Nature incorporates limits to objective investigation. We may learn some things about 'dark matter' but otherwise it is like an individual's subjective states which are not accessible to objective appraisal. And we are limited also by uncertainty. The movement of particles is governed by forces (the collective will) but we cannot measure accurately as Heisenberg revealed.

There are many implications of all this, some of which will be explored in the next part of the essay but one interesting aspect is that the billions of people who have sensed the existence of a god are not too far from the truth. But it is not an all-powerful, caring entity and there is no point in supplication; it is up to us, little by little, to take control.

5. Observer-participancy

Earlier it was noted that there is a modern time-related scientific problem in addition to the three classical ones. Recent science has revealed the startling idea that objective reality cannot exist unless there is a conscious 'observer'. How can we therefore think of the Big Bang and the early chaos as being 'real'?

Some resort to puzzling devices such as 'backward quantum causation' but the Alphomist answer is that dark energy provides the necessary subjective component. As dark energy is converted from general consciousness to the (much higher level) individual version then the basis of 'realisation' shifts. However, until the point of apotheosis, when all of the higher level consciousness will combine, the residual collective consciousness will doubtless continue to realise for us the material world.

PART FOUR: ALPHOMISM REINFORCED

This part is intended to show some of the ways in which the Alphomist two-phase description of the universe is strengthened by much of modern science.

1. The Three Problems

The essay started with a reference to three categories of problem faced by modern science. The Alphomist stance on these problems is summarised below.

1 Infinity

Evidence was presented that 'infinity' is a troublesome notion which leads to several anomalous outcomes. Alphomism argues that this is because the elision from the idea of a process (something continuing without a clear end) to a state or a place (ie 'at infinity')

is illegitimate and that in fact ‘ infinity’ in this sense is ‘uncashable’ and should be replaced by the notion of ‘indefiniteness’. The universe is, at any one time, of a definite size, though this perhaps changes constantly and therefore is, in this limited sense, indefinite. (‘Perhaps’ because of the possibility that there is a dark energy envelope of constant dimensions).

2. Mind/body

It was suggested that it is logically impossible to arrive at a causal account of the relationship between the objective and subjective realms. The two aspects have to be seen as complementary in the way that wave and particle forms of quantum objects relate to each other. It was also proposed that subjective activity can be accounted for only if there is an energy source external to the body and that this source is ‘dark energy’

3. Causation

Three problems relating to causation were identified, namely, ‘prime mover’, the source of the laws of nature and the meaning of ‘random’.

Alphomism contends that there can be no linear account of the origins of everything. We have no option but to declare ‘existence!’ It was suggested, however, that the unease which we generally experience with this approach will vanish once we are immersed in the Alphoman state of timelessness.

It was argued that the laws of nature were devised by our Alphoman personae and are sustained by a residual conscious element which is formed by dark energy.

Finally, it was proposed that the only source of true randomness is free will. The movements of sub-atomic entities are, it is suggested, powered by the ‘dark energy’ residual consciousness which leaves space for the development of individual freedom but which ensures that, overall, the system of Nature stays on course.

4. Conclusion

It is suggested that it is a strength of Alphomism that it can provide a possible escape from these difficulties relating to infinity, mind/body and causation.

2. A History of Energy

It would seem that very few scientists deny the reality of the vast explosion which occurred some 14 billion years ago. And a law held to be inviolable is that in the ensuing process energy is neither created nor destroyed in any interaction; it is merely moved or transformed. But equally sure is that energy gets ‘used up’, in that it becomes steadily less available. (Oddly, this is sometimes referred to as an increase in chaos but truly it is a ‘shuffling down’ to an inertial state which might be seen as maximally organised).

There is a puzzle, therefore, about the location and form of all of the universe's energy prior to the grand eruption and in the final outcome.

The Theory of Relativity says that at the time of the Big Bang, energy was contained in a body which had 'infinite density'.

It has been argued that this is a quasi-religious opt-out. In this context 'infinite' can have no cashable meaning.

But it might be possible to evade the awkwardness of 'infinite density' and yet still claim that prior to the explosion the laws of physics did not operate. In a New Scientist news piece we are advised[123] that:

'The accepted wisdom in modern cosmology is that it is meaningless to ask what came before the Big Bang. That's because the Big Bang is what physicists call a 'singularity' – a moment at which the equations of physics break down.'

Obviously, if the otherwise inviolable rules of physics have broken down then there is no need to defend the laws of thermodynamics. But if there are no regularities there is only mystery. Paul Davies puts it[124] that:

'Because the singularity represents infinite curvature and density, and an end to the basic physical theory that describes all this, we cannot suppose that any physical object or influence can penetrate the singularity, so there is no way of knowing whether there is anything on the far side of it or not.'

It is surely an uneasy position for a scientist to give up the chase for knowledge and it is perhaps unsurprising that some, at least, are not content.

In the New Scientist article[123] Martin Bojowald, a theorist at the Pennsylvania State University, University Park, is quoted as saying: '*No one is happy with the Big Bang singularity.'*

Hawking, at one time a free user of the term 'singularity', evidently eventually felt uneasy about the idea. He tells us[125] that he has *'changed his mind'* and that he is trying to persuade others that there was no singularity. He argues that it *'can disappear'* once quantum effects are taken into account and proposes that at one time the universe must have been so small that quantum mechanics were relevant.

Bojowald's assertion that there are many who are dissatisfied with the 'breakdown' hypothesis is supported by Davies who tells us that *'most theoretical physicists'*, whilst drawing the investigatory line at the 'singularity', nevertheless believe that the laws of physics somehow transcend the physical universe. He quotes Heinz Pagels who wrote[126] : *'It would seem that even the void is subject to law, a logic that exists prior to time and space*.'

But if there are laws they surely have to have some energy basis. For scientists, pure Platonic ideals are surely unacceptable.

One attempt to avoid the various conundrums is outlined in the New Scientist article[123]. It explains that Bojowald works on loop quantum gravity theory (LQG) which is an attempt to produce the much-desired unification of quantum mechanics and relativity. LQG proposes that space-time is made of tiny interconnected loops, akin to a smooth fabric. Using this idea and *'running the equations backwards'* Bojowald claims to have shown that the singularity can be avoided via the hypothesis that the universe expands and contracts repeatedly.

This 'repeat explosion' approach is sometimes referred to as 'Bounce Theory' but, as Davies points out[127], far from saving the second law of thermodynamics it puts it under greater pressure. If energy is set to run inexorably down, what forces are responsible for this heartbeat process?

The original form of Alphomism embraces the idea that the current expansion of the universe will be followed by a contraction. At the end of this section an alternative notion is explored but if the idea of contraction is allowed then the possibility of repeated 'heart beats' cannot be ruled out. But until there is hard evidence of repetition, the ruthless razor is applied. The simplest, Occam-approved, hypothesis is that there is but one cycle. The outline of the single closed loop process has already been given but it will perhaps be useful to recap here.

It is suggested that prior to the explosion, almost all of the energy is devoted to conscious activity. From a physical point of view it is in dark mode and therefore not objectively detectable. The primary source of energy in Alphoma is will power.

The explosion, necessary to generate meaning and to provide the basis for the development of individual will, sets up the physical system. The evolutionary outcome of the system is the generation of self-conscious beings who gradually convert objective energy into subjective and whose combined will-power brings about the contraction of the physical universe and the creation of Alphoma. (Though, as noted above and discussed almost immediately below, the process might not be a physical one).

It is interesting in this context that rather than the primal atom being of infinite density it might be better envisaged as having zero physical attributes. The arguments for this are as follows.

Estimates suggest that the conversion of 4% of the universal stock of energy resulted in a mass of 10^{50} tonnes. At the same time gravity, a force clearly essential to the physical regulatory process, was initiated. About this, Paul Davies writes[128]:

'A simple estimate of the gravitational energy binding all the galaxies to each other gives an effective mass for the gravitational field (using $E = mc^2$) of about ***minus*** *10^{50} tonnes, which is roughly equal (and opposite)to the mass of all the stars and other stuff. The fact*

that two numbers are of the same order, and of opposite sign, suggests very much that they are doing their best to cancel each other and make the net mass of the universe zero!'

The point is soon reinforced with:

'Cosmologists knew for years that the positive and negative contributions to the mass of the universe roughly cancel out. But WMAP[n13] clinched it. To within the 2% accuracy of the measurement, the satellite found space to be flat, which translates into the conclusion that ***the universe contains no net mass at all!****'*

This suggests that the religious formulations that the universe was created out of nothing is not too far removed from the truth. It seems to be the case that the *physical* universe was produced by a separation of dark energy which is, purely from the objective point of view, tantamount to nothing. Of course Alphomism sticks by the 'nothing out of nothing' rule; the stock of energy remains constant but its form changes.

An interesting aside here is that gravity might turn out to be perceptible only by its effects. Whereas we can detect photons and other minute entities, it has not so far been possible to perceive the presumed agents of gravity. Hawking tells us[129]: *'Real gravitons make up what classical physicists would call gravitational waves , which are very weak – and so difficult to detect that they have never yet been observed.'* Perhaps they never will be.

This notion of a breaking apart to create physical complexity is reinforced in relation to the other three fundamental forces. Hawking tells us[130] that at very high energies, which of course was the condition at the time of the Big Bang, the strong nuclear force gets weaker and the electromagnetic and weak nuclear get stronger. Hawking feels justified in alluding to a *'grand unification energy'*. He writes: *'…these three forces would all have the same strength and so could just be aspects of a single force'* and notes further that at this level of energy, the different spin ½ particles which make up matter, for example, quarks and electrons, would *'also be essentially the same.'*

In the New Scientist piece[123], Thomas Thiemann of the Max Planck Institute for Gravitational Physics at Golm, in Germany is quoted as saying that whilst some of the LQG assumptions might turn out to be too simple, the model is *'the cleanest derivation of a pre Big Bang scenario that any physical theory has delivered so far.'* It might concluded that it is so because it is quintessentially a loop approach.

There is, as noted at the end of the previous section, another striking reinforcing aspect of the Alphomist take on the history of energy. If it is true that the dark version is the basis for an all-pervading consciousness then this provides the quantum element which Wheeler and many others think is essential for there to be existence. Consciousness, it is suggested, is ever-present but its form changes.

Support for this formulation comes from loop quantum gravity theory. The New Scientist exposition[123] outlines the parameters under which LQG works and amongst them is a proviso that most, but not all, of the information about what came before the Big Bang gets lost. This is precisely the Alphomist position, in that the residual conscious element which is facilitated via dark energy is no omniscient god but a manifestation of shared consciousness. This performs its essential tasks but otherwise has no executive input into people's lives. The article also quotes Princeton's Paul Steinhardt as endorsing the LQG model and saying that *'It is important to lose some information but not everything'*

It should be noted, however, that Alphomism claims that the information from Alphoma is not totally *lost*; it is, rather, fragmented and it is via the reconstruction of the puzzle that ever-increasing control will be taken, including that of the reversal of the expansion of the universe.

This claim might seem fanciful. Looking at things from a purely objective point of view, James Randerson asserts[131] that most cosmologists believe that the universe will expand until the stars burn out. He tells us that *'mechanisms exist'* which will allow the universal constant (which drives the expansion) to decrease but this would take too long to prevent burn out

The Alphomist response to this is that, very likely, we will not be faced with a physical re-assembly. Indeed it is suggested that the notion of the primal atom might turn out to be just a useful conceptual device. Some scientists suggest that it is more appropriate to suppose that the great explosion happened 'everywhere'. Perhaps the best model is of the 'dark energy' envelope as a constant factor of fixed dimensions.

Thus, it may be the case that thousands of years hence, when the populations of far flung planets have made contact and huge amounts of knowledge have been shared, and when consciousness has been vastly expanded and enhanced, that we will not have need of physical travel and communications devices. Perhaps the process of assembling all the pieces will so exalt the subjective that we will converse via thought and so mentally construe the universe that no physical reconstruction will be necessary.

If this model is the most useful, then we have to think of the mesh of dark energy extending to limits we cannot yet measure. And in fact the notion of a mesh or membrane extending throughout the universe would seem to be reinforced by the work of Peter Higgs at Edinburgh University. In the mid sixties he proposed that there is an invisible, all-pervasive field which holds the key to the nature of matter and mass.

The background to Higgs' work is outlined by Ian Sample[132]. He explains that the 'building blocks' inside an atom weigh nothing and so the question arises as to where weight (as distinct from mass) originates. Higgs's proposition is that the universal background field is 'sticky' in a way which causes particles to cling. Some particles find the field more adhesive than do others but it has no apparent effect on photons at all. Detection of the field itself is currently impossible but Higgs's calculations suggest that there is a particle created by the field, a possible entity which (even though Higgs'

calculations were separately and almost simultaneously confirmed by two Belgians, Brout and Englert) is now known as the Higgs boson.

Ian Sample adds:

'We can see only 4% of the matter that makes up the universe. The Higgs particle may shed light on the rest – the dark matter in which galaxies form, and the dark energy which drives the expansion of the universe, for example. The particle may also shed light on string theory, an ambitious but powerful way of viewing the universe that sees every particle not as a point but as a vibrating string of energy, where different frequencies create different particles.'

At the time of writing, the huge particle accelerator sited close to Geneva is just about to be fired up. One of the primary purposes of the vast machine is to locate the Higgs boson. Ian Sample tells us that Hawking believes that it will not be found because, in Sample's words, it will be *'scuppered by mysterious, fleeting black holes'* which are expected to appear. However, as already noted[10], it is no longer sure that black holes are all-consuming so perhaps the elusive link between the dark and the light will in fact be shown to exist.

3. Design

In 'The Goldilocks Enigma' Paul Davies presents a welter of support for the notion that the universe was designed by an entity of vast intelligence and resources. He quotes Galileo[133] as suggesting that '*the great book of nature'* is written in the language of mathematics, a thought echoed by the English astronomer James who asserted that: *'The universe appears to have been designed by a pure mathematician.'*

Davies adduces evidence[134] that the size of the Big Bang was *'just right'* in that the expansive thrust and the pull-back of gravity are precisely matched. He writes: *'Our universe has picked a happy compromise, it expands slowly enough to permit galaxies, stars and planets to form, but not so slowly as to risk rapid collapse.'*

In this context, there is a further factor in that the rate of expansion is the same in all directions, a circumstance which is allegedly *'essential for evolution'*. On this Davies comments[135]:

'Evidently the Big Bang had the same vigour in all directions, and in all regions of space, tuned to very high precision. In itself, this would be enigmatic enough, but it looks downright contrived when we remember the existence of the horizon[n12] *.'*

Davies notes also[136] that had the temperature been much higher than it was just after the Big Bang then atoms could not have existed because electrons would have been stripped away from the atomic nuclei resulting in ionisation and hence a state called plasma.

Precise conditions were necessary for the fusion of three helium atoms into the utterly essential-for-life carbon. It is calculated that a change in resonant energies of only 0.0001% would have been sufficient to disrupt the process. If the weak force that binds atomic nuclei had been just a bit weaker there could have been no hydrogen. If the strong force had been just a little stronger there would have been no atoms at all.

Along similar lines Hawking tells us[137] that if there had been the same number of quarks and anti-quarks at the start of universe they would have annihilated each other, leaving mostly radiation but *'…hardly any matter. There would then have been no galaxies, stars or planets on which human life could have developed'*. Later[138] he confirms that the hypothesis of a hot start to Nature is in accord with data but asks:

- why *so* hot?
- why so uniform?
- why the 'critical rate' of expansion
- what was the origin of the density fluctuations that caused galaxies etc?

Hawking tells us[139] that: *'The general theory of relativity, on its own, cannot explain these features or answer these questions because of its prediction that the universe started off with infinite density…'*.

Hawking's list of questions demand an answer. If our best general theory cannot supply the answers then we have to ask; who or what determined that conditions were so ideally suited to the emergence of consciousness?

There are further indicators of inherent organisation which emerge from the valiant attempts of scientists to get to grips with the tiny workings of the micro-world. The current way of describing things will very likely be refined as research continues but even at this stage there is compelling evidence of order. Quarks, the ultimate building blocks of matter, are thought of as having six 'flavours' each of which has three 'colours'. This seems tellingly neat.

Further, atomic entities are deemed to have 'spin'[n10] and there are two groups of particles. Those of Spin ½, which make up the matter in the universe, and those of Spin 0, 1 and 2 which are associated with the various forces.

Hawking tells us[140] also that there are three 'symmetries' which might be seen as relating to the energy/space/time trinity. These correlations are designated by letters and they record that there are the same laws for:

C particles and anti-particles (the energy aspect?)
P mirror images (the space aspect?)
T forwards and backwards (the time aspect?)

This bit of apparent neatness is, however, qualified by Hawking's comment that these symmetries are not obeyed in some circumstances.

The four fundamental forces can be summarised neatly as follows.

- gravity (always attractive, universal, has no mass and held to be mediated by a particle of spin 2 called a 'graviton')
- electromagnetic (positive and negative, mediated by mass-less particles of spin 1 called photons)
- weak nuclear (responsible for radiation, operates on spin ½ particles – mediated by 3 other spin 1 particles called 'massive vector bosons')
- strong nuclear (holds quarks together in the protons and neutrons. – carried by 'gluons' = Spin -1 particle)

But it may be that there is even more evidence of design for Hawking, in connection with the search for the 'grand unified theory', and as noted earlier, tells us[141] that: *'Ultimately, most physicists hope to find a unified theory that will explain all four forces as different aspects of a single force.'*

In view of this apparent order and potential simplicity it is unsurprising that Hawking sometimes seems to be assuming the existence of a designer, for example when he writes[142] that the initial state of the universe had to be *'very carefully chosen'* and also[143]:

'What were the 'boundary conditions' at the beginning of time? One possible answer is to say that God chose the initial configuration of the universe…but if he had started it off in such an incomprehensible way, why did he choose to let it evolve according to laws which we could understand?'

A few pages later, however, Hawking says[144] that work on an approach known as 'the chaotic inflationary model' *'showed that the present state of the universe could have arisen from quite a large number of different initial configurations'*. But even with this caveat he later comments that: *'It cannot be the case, however, that **every** initial configuration would have led to a universe like the one we observe.* This still leaves the questions, therefore, as to who designed the various versions and why one configuration prevailed rather than any other possibilities.

Perhaps the most telling remark in support of the notion that the material universe is designed comes from Rosenblum and Kuttner[145]:

*'To produce a universe resembling the one in which we can live, the Big Bang had to be finely tuned. How finely? Theories vary. According to one, if the initial conditions of the universe were chosen randomly, there would be one chance in 10^{120} ……that the universe would be livable. Cosmologist Roger Penrose has it vastly more unlikely: The exponent he suggests is 10^{123}. By any such estimate, the chance that a livable universe like ours would be created is far less than the chance of randomly picking a **particular** single atom out of all the atoms of the universe.'*

As was suggested earlier, it would seem that there are but three ways of dealing with the question of the source of design in the universe.

- We can assume, as Einstein did and Hawking sometimes seems to, the existence of a transcendent deity. However, apart from the fact that there is no reliable evidence, other than 'design' for the existence of such an entity there is the further problem, intractable it would seem, of accounting for the origins of god. The theistic hypothesis just moves things further back and offends the sound principle enunciated by Occam.

- We can invoke quasi-religious concepts such as 'infinity' and 'randomness' or, a bit further down this road, adopt what Alphomism claims to be the desperate ploy of the multiverse hypothesis.

- We can step outside the religious and scientific orthodoxy. As Rosenblum and Kuttner express things[146]: *'It would seem more likely that something in yet-unknown physics determines that the universe **had** to start in the way that it did.'*

It will be evident that Alphomism favours this third approach and the suggested closed loop has already been described. Existence has to be taken for granted and some kind of self-direction embraced.

In a relatively recent article[147] Paul Davies expressed the only coherent solution to the design question in this fashion:

'*Thus, three centuries after Newton, symmetry is restored: The laws explain the universe even as the universe explains the laws. If there is an ultimate meaning to existence, as I believe is the case, the answer is to be found within nature, not beyond it. The universe might indeed be a fix, but if so, it has fixed itself.'*

4. Time

It is central to the theory that Alphoma is a state of being where energy is in continuous, waveform, mode and that therefore it is timeless. This is not intended to imply that our Alphoma selves have no experience of temporal phenomena; just that the flow of things is in our control. We can make of time what we will instead of being, as we are in Nature, entirely in its steely grip.

Original Alphomism was reticent about a temporal element to Alphoma but as a direct result of giving closer consideration to scientific findings, it is now suggested that Alphoma is underpinned by a tiny residual spin ½ material element which keeps the clock ticking. It matters not to Alphomans what the duration of that time bomb is. A microsecond's objective existence of the timeless sphere is sufficient to generate a subjective state which has no inherent clock.

Despite this residual temporal element in connection with Alphoma, it is reasonable to think of a beginning of 'Nature time' (at the Big Bang) and an end (with, according to the Alphomist account, reintegration). There is thus, ultimately, a fixed amount of time for the Nature phase. This is in keeping with the other fixed elements, for example; the total of energy, absolute zero temperature, the speed of light, the cosmic constant and the constancy of gravity.

Mention was made earlier of the notion of 'quantum backward causation' whilst Hawking suggests[148] that the attempt to unify gravity with quantum mechanics creates a need for *'imaginary time'* which is *'indistinguishable from directions in space'*. The meaning of this pronouncement is not brilliantly clear but Alphomism suggests that it might be one of those occasions where Occam should rule.

5. Gravity

It seems that the most likely account of the instant and all-pervasive effect of gravity is that it is mediated via dark energy. From the Alphomist perspective this means that the residual conscious aspect in the universe is holding it all together.

There is an interesting question as to what will happen as consciousness develops and will-power begins to direct the operation of the universe.

The Alphomist suggestion here is that the physical force of gravity has a precise analogue in the subjective aspect, a force we call 'love'. As ever more energy is converted to self-conscious use the balance will shift such that the total of gravitational energy will decline as the total of energy devoted to the generation of love increases. The attractive force in the universe will change from a physical force to a mental one.

6. Communication

The Alphomist thesis depends on all the conscious beings in the universe gradually getting together to engineer the creation of Alphoma. This very evidently depends upon communication but with the vast distances involved and the apparent limit set by the maximum speed it would seem that there are insurmountable practical problems.

Of course it may be that the Theory of Relativity is in some respects deficient, or it could be that there is a key distinction between what might be the case and what we human beings can currently *perceive*. Perhaps the speed of light merely sets the limit as to what we can measure.

In a Scientific American article[149] (January 2000) Lawrence H Ford and Thomas A. Roman discuss worm holes and 'negative energy'. They suggest that space could contain tunnels which would *'…allow for faster than light travel; and time machines, which might permit journeys into the past.'*

The highly sceptical Alphomist attitude towards time travel has been outlined but it is surely not impossible that it might one day be possible to exceed the speed of light.

However, it is certain that there has to be a maximum attainable velocity and it seems reasonable to suggest that this is set by the speed of light. If this is the case, how will communication throughout the cosmos be possible?

In the original version of Alphomism the reliance was placed on the drawing together of the distributed material. It was suggested that as the proportion of consciousness increases the rate of expansion of the universe will be slowed and, eventually, the process reversed. In the light of modern science it is possible to be bolder.

Firstly the phenomenon of entanglement suggests that there could be very subtle ways of communicating instantly over vast distances. Secondly the existence of the matrix of dark energy suggests that eventually conscious beings will have access to immense subjective power. All this is admittedly vague but the apparent fact of a universal connectedness suggests that we should look to subtle methods of communication and control.

No doubt we will be dependent for a long time to come on physical travel and electro-magnetic means of communication but as we grow and learn, as we make the physical aspect of existence safe, we will begin vastly to extend the range of subjective communication. Very far into our shared future there will surely cease to be a need for physical travel; we will use the dark energy matrix to communicate by harnessing subjective phenomena.

7. Free Will

Alphomism depends utterly on there being free will, the driving force of the universe, yet of course it is a controversial concept.

Rosenblum and Kuttner quote J. A. Hobson as saying[150]: '*Those of us with common sense are amazed at the resistance put up by psychologists, physiologists and philosophers to the obvious reality of free will'* yet there are very many 'hard determinists' who claim that every event in the universe is caused by an objective force and thus aver that freedom is an illusion. Presumably Hobson holds that they lack common sense.

Paul Davies writes[151] that the Copenhagen interpretation of quantum mechanics *'seems to deny free will'* but goes on to say that; *'Most of us can't accept that denial.'*

Of course there are other interpretations of quantum phenomena which some take to all but *prove* freedom but Tim Maudlin, philosopher of physics at Rutgers University, makes the point[20] that; *'Quantum randomness as the basis of free will doesn't really give us control over our actions. We are either deterministic machines or we're random machines. That's not much of a choice.'*

The oxymoronic nature of the term 'random machines' has been explored earlier and it has been proposed that the lack of precision over the meaning of 'random' is at the root of most of the trouble relating to the debate about free will. The 'common sense' rejection of determinism is not based entirely on subjective considerations; there is an underlying confusion.

What is surely acceptable by both parties is that there are *clearly* two broad categories of human action.

Some are manifestly not in our control. They are caused by internal or external forces which, usually, can be identified and even quantified.

Then there are others which seem to be initiated by us and these we usually think of as being the outcome of an exercise of will

Thus, we know *a priori* of something which we can reasonably call 'personal freedom'. Languages richly reflect its subjective reality. We decide, we make efforts of determination, we perform thousands of unconstrained actions daily. The reader of this text has a huge range of free will possibilities; make a drink, go for a walk, continue reading, pick up a pen, call a friend, recite a poem, swat a fly…. *Of course* there is a difference between such willed actions and, for example, a movement that is driven by a tic or an external force. That there are these two categories of action cannot be denied.

But determinists claim that the sense of freedom is an illusion for, they contend, all the internal workings of the body, including those of the mind, are caused by forces which are determined by the laws of nature.

This is a very bold claim, for the subjective difference between willed and unwilled actions is utterly palpable. To defend such 'hard' determinism successfully, its proponents have to deal with the following questions:

- Firstly, if we are nothing but totally determined machines, why does it seem otherwise?

- Secondly, what is the mechanism which underpins total determinism? What proof is there that there is universal mechanistic causation, especially in relation to 'random' events? Even if we eventually find mechanistic explanations of apparently 'spontaneous' events we will still need to give an account of the relevant forces. What could be a satisfactory end-point of this chain of explanation?

The first could perhaps be shrugged off if the second could be answered. This would not be very satisfactory but if it can be shown that there *are* all-pervasive forces then it would have to be accepted that, for reasons which would doubtless remain mysterious, the sense of freedom is illusory.

The focus at this point, therefore, is on showing how the programme to identify underlying forces is highly unlikely to succeed.

The opening contention relates to the uncertainty principle. As noted earlier, there is a distinction to be made between what *actually* happens and our ability to *measure* what happens (that is the 'hard' and the 'soft' versions of the theory). It could be that there *are* deterministic laws governing the behaviour of atomic entities but if, in fact, we can never measure both position and velocity with accuracy then we will never be sure whether quantum leaps have predictable causes or not. If this is the case, then the determinist goal of *proving* universal causation will not have been achieved.

At the risk of labouring the point, it must be insisted that it is of the utmost importance that the use of the term 'random' is not blithely sequestered by determinists to cover a failure to predict. 'Random' does not mean 'objectively caused'. Indeed, Alphomism argues for the opposite; unpredictable events are taken as evidence of the operation of will. By stark contrast, what cause can a determinist ascribe to 'random' events?

There are some, however, who claim that we will perhaps be able to escape from the paradox of randomness. Gerald 't Hooft suggests[20] that there might be a *'hidden layer'* of reality at scales smaller than the Planck length. These are neither particles nor waves but 'states' which might behave predictably.

But these states can be tracked for very tiny times only. In the same article it is recorded that: *'Our measurements illuminate these final states but because the prior information is lost, we can't create their precise history'*

Despite this apparently fatal breakdown in the chain, 't Hooft evidently still believes that we *could* predict the behaviour of particles by getting to grips with these 'states' although he does concede that such a scenario is not amenable to experiment currently.

Mathematicians John Conway and Simon Kochen at Princeton University are quoted as opposing 't Hooft *'on free will grounds'*. They present a contrary scientific case but the article records that: *'Kochen and Conway stress that their theorem doesn't disprove 't Hooft's theory. It simply states that if his theory is true, our actions cannot be free. And they admit that there's no way for us to tell.'*

Hans Halvorsen, philosopher of physics at Princeton is also quoted as saying that: *'Kochen and Conway can't tolerate the idea that our future may already be settled but people like 't Hooft and Einstein find the notion that the universe can't be completely described by physics just as disturbing'*

But at this point the libertarian can ask the seminal question; why should it be assumed that *physics* can provide all the answers?

Halvorsen says: *'Philosophy has separated itself from science for far too long. There are very important questions to be asked about free will and maybe physics can answer them.*

It is strongly suggested here that it is *metaphysics* rather than pure philosophy which can bridge the gap. Currently scientists cannot predict quantum behaviour and cannot identify a system of forces which causes quantum leaps. Alphomism predicts that this will ever be the case because the quantum causes are subjective.

Linked to this assertion is the claim that there are brain events which will seem, from the objective point of view, to be spontaneous. As noted earlier, there is evidence that this is so. Of course, the determinist will insist that underlying forces will one day be discovered but the existence of an apparently spontaneous firing of neurons is another powerful indicator that the 'hard' version of determinism is wrong.

So, in the absence of any proof whatsoever of the existence of underlying forces, the challenge remains for the determinist of answering the two questions raised at the beginning of this section, that is;

- If we are machines why do we feel otherwise?

- What possible rigidly determinist account of the entire universe could be formed?

Until determinists can come up with incontrovertible empirical evidence and/or provide a complete system of metaphysics the ball is very much in their court.

8. Evolution

The fundamental principles of evolution enunciated by Darwin, namely, genetic inheritance, mutation and survival of the fittest explain a very great deal about the way in which self-conscious beings emerged

There are however some serious questions about the theory of the origin of the species.

- Firstly, it relies on mutation of genetic material. Some mutations are clearly caused by radiation and so forth but it is sometimes suggested that such changes 'just happen'. Can we really be content with theory which relies on unexplained phenomena?

- Secondly, what is the link between the inorganic and the organic?

- Thirdly, what is the point of the apparently useless material known as 'junk DNA'?

The first question is, of course, very akin the one relating to quantum uncertainty. Perhaps all mutations will one day be accounted for via identifiable forces but then there will still remain the problem of accounting for these forces.

Alphomism strongly suggests that some mutations will not be explicable via physical processes, they will seem to investigators to be 'random'. In Alphomist terms it is the dark energy processes which govern quantum behaviour which are at the root of genetic mutation. The collective self, established by the designers, ensures that mutation takes place within limits. There is a drift towards complexity but there are considerable degrees of freedom.

Paul Davies seems to give this notion some credence. Writing of 'quantum computation' he proposes[152]: *'If life is formed by trial and error, speed is the key. This suggests that life may have emerged from the quantum realm directly, without the need for chemical complexity'*. Clarifying to some degree, he goes on to speculate that large organic molecules were probably used for data storage and adds; *'At some stage these complex molecules took on a life of their own, trading speed for robustness and versatility.'*

There is a different strand of evidence which suggests that the evolutionary process is far more complex than Darwin proposed.

In a newspaper article on evolution it is reported that a team led by Jack Werren, of the University of Rochester, worked on fruit flies infected with parasitic bacterium and found[153] that the genes of an organism fused wholesale into the genome of an entirely separate species. Werren is quoted as saying that; *'The parasite's entire or nearly entire genome has been absorbed and integrated in the host's*.' The article comments that: *'Such large scale transfers of genes would allow species to acquire entirely new functions and abilities in a very short space of time….'*

Perhaps this 'genome assimilation' process is mediated by dark energy processes to obviate the need for a very slow trial and error process.

The second question, concerning the step from inorganic to organic, is also covered by Alphomist theory. There *is* no step. It has been argued that all energy has an objective/subjective duality. Consciousness becomes palpable only when organisations become complex and dynamic.

On the final question, the original version of Alphomism predicted that the 95% or so of DNA material which was thought to be inactive will be found to be of crucial significance.

Erlend Lee, a specialist in the study of evolution, notes *(pers comm)*,: *'..some of the junk material has been promoted to effective material when it was realised that they mediated the actions of other genes. It does seem that some of the junk material is indeed junk and can have various origins. Some of it is viral DNA which has been injected into the host animals' DNA and subsequently silenced. Other tracts of DNA are duplicate copies of operative genes whilst yet others are ancestral hangovers governing functions which are no longer needed.'*

Nonetheless, it seems that there is a very significant proportion of apparently 'useless' DNA. However, according to some commentators, is not useless at all.

An Ian Semple report[154] on an article in Nature tells of a genetic study involving eighty teams in eleven countries over a period of five years. A major conclusion is that the so called junk DNA is *'highly active.'*

Perhaps even more telling from an Alphomist perspective is the conclusion that:

'Other sequences of genetic code are thought to be "on standby", awaiting a time further down the evolutionary path when they will be beneficial to human beings.'

Thus, the research strongly indicates that DNA is doing a host of jobs other than the genetic one. In the article, one of the scientists, Manolis Dermitzakis, is quoted as saying:

'The findings highlighted how scientists had become so blinded by the importance of genes that the role of other parts of the genome had largely gone unappreciated.'

This is not the only experiment to suggest that DNA has a role other than its genetic one. Alok Jha, writing about research by Peter Andolfatto at the University of California San Diego, reports[155] the finding that 'junk' DNA is '*critical for evolutionary survival*'.

As already noted, Alphomism suggests that it is not impossible that some of this material contains fragments of the Alphoma puzzle which we can access via introspection. This process leads to the appearance of inspirations which, via testing and research, we turn into useful theories.

9. Thought

In the original version of Alphomism it was proposed that the so-called junk DNA was the *only* repository of fragments of the universal picture. This, it was suggested, was where our ideas come from. In this up-dated version it has been proposed that an alternative, or perhaps even additional, source of data is dark energy. However it is perhaps worth noting that some commentators support the idea that DNA contains a vast 'library' of information fragments created by the big bang.

An example of support for this notion is provided by a Swiss-Canadian anthropologist Jeremy Narby. In the book review cited earlier[102] Jay Griffiths tells of Narby's claim that the 'twin snake' model which we now use to represent DNA has been around for thousands of years. Narby contends that DNA is the source of such knowledge, attained through non-rational states of consciousness, associated with shamanic ritual and the use of hallucinogenic drugs. Narby suggests that the 'creator snake' idea was very widespread amongst our distant ancestors. He claims that the botanical and medical knowledge of Amazonians '*..can astonish western-trained scientists.'*

The review also quotes former professor Dr. Jean-Pierre Dufaure as asserting that: *'(Narby) opens new directions to understand ways of knowledge. I am astonished by the plant knowledge of Peruvian Indians which they get through non-rational or intuitive means.'*

As noted earlier, it is entirely possible that all ideas come from 'raiding' the interior store of knowledge fragments and piecing them together but it is also feasible that dark energy is the other vital source. Through the agencies of our brains the material held in the dark energy mesh perhaps interacts with that in the DNA store. The 'quantum properties' of the mesh allow timeless communication. We are working constantly to put the bits together, to 'make sense'.

There is strong subjective evidence of such a process to anyone who is willing to 'listen' to their own mental goings-on. For anyone who is even half alive, all manner of thoughts pop up. We are exceedingly swift to put them through our rationality filter. We make use of what we can and discard the remainder (unless we are artists, in which case we turn them into creative works!).

As noted earlier, we are at our best as information-retrievers when we find ways of turning down the power of reason. Of course, having acquired data we then need to use our rational powers to position the pieces and to reject what doesn't work.

One possible example of enhanced access to fragmented data is the phenomenon of near death experience. People who have come close to dying, and have thus attained an advanced state of physical 'shut-down', often claim to have seen a paradise state prior to being 'told' that their time has not yet come and that 'there is more work do'. Perhaps they experienced a very strong hint of Alphoma and their reason (returning as the threat of death receded) rationalised the temporary loss of the vision as an explanatory voice.

It was also mooted in a previous chapter that our earlier ancestors relied less on reason than do we and thus had enhanced intuitive faculties. They picked up ideas and put them together in imaginative ways and thereby shaped our intellectual inheritance. This is why Alphomism suggests that all long and widely held beliefs should be taken seriously. We should listen, with proper judgement and discrimination, to old ideas and take what seems useful amongst them into our modern belief systems. We should also, it is suggested as an aside, temper our latter-day zeal for the objective and, without compromising safety, open up some long-disused departments of our minds

A prime example of a long held intuitive belief which modern science has perhaps vindicated is the Adam and Eve story. In a newspaper article[156] Johnjoe McFadden, Professor of molecular genetics at the university of Surrey, cites research by Rebecca Cann at the University of California at Berkeley. Cann investigated mitochondrial genes and discovered that *'..our female line can be traced back to a single woman who lived in Africa about 200,000 years ago.'* .

Erlend Lee comments (*pers comm) 'Mitochondrial Eve is nothing to do with biblical Eve. She was not a first woman and she was not an only woman. Her case is highlighted simply because a mitochondrian can be traced back through the female line by itself. The same is true of the Y-chromosome which can in theory be traced back through the male line of ancestors to a 'Most Recent Common Ancestor (MRCA) male. This Adam and Eve never met and were separated in time by about 80,000 years. There is a hypothetical and different 'Eve' and 'Adam' for every gene in the human genome.'*

Despite these separate streams however, the notion of a single source for each one and a shared genetic history does perhaps suggest that the Adam and Eve *idea* is an approximation to the truth. If, as proposed, DNA and/or dark energy provide us with fragments of the truth then it is not entirely implausible to suggest that our ancestors intuited significant elements of the scientific story but interpreted it in fable fashion.

No doubt earlier people also picked up on ideas of an erstwhile state of perfection, of timelessness, of paradise lost, but not just of lost happiness; they sensed also a great loss of power. The myth of an almighty god could easily flow from such memory fragments. Perhaps some thinkers also intuited that there is a residual safety net which they could not see but which we now know of as dark energy. It is surely understandable that this should lead to the idea that total power persisted and that the destroyer of the wonderful garden had somehow to be appeased.

10. Vision

Paul Davies tells us[157] that: *'Many scientists have speculated that, as the time-line stretches towards infinity, so an emerging distributed super-intelligence will become more and more god-like, so that in the final stage the super-mind will merge with the universe; mind and cosmos will be one.'*

Of course the 'time line' can never reach 'infinity' but here, admittedly without addressing the laws of thermodynamics, is evidence that 'many scientists' predict that a gradual increase in consciousness is the future of the universe

In the same place Davies expresses the belief that there is no reason why life on Earth should not persist for trillions upon trillions of years. He writes *'A progressively larger fraction of the universe will be brought under intelligent control.'*

Given the anxiety about global heating, possible food and fuel shortages, nationalistic struggles, the emergence of the super-rich, the anger of the dispossessed and many other current problems, some may be sceptical about life *on Earth* lasting trillions of years. But, as mentioned earlier, it is highly likely that very many inhabited planets exist throughout the cosmos.

The discovery of one likely candidate was announced only recently[158]. Stephane Udry, working in Geneva, reports on a planet known as Gliese581c. It is 1.5 times the size of Earth and has a surface temperature of 40 degrees centigrade, a hot but perfectly human-

friendly summer's day. Udry expresses the belief that Earth-like planets are *'common'*, a claim that is backed by much research [n18].

If this is so, we can surely take it as given that the bio-friendly nature of the universe will ensure that there are billions of conscious beings scattered about the cosmos. There is evidence[159] that we Earthlings have a part of our brains (the posterior superior temporal sulcus) which is more active in altruistic people. Doubtless the aliens will also have developed altruism, perhaps to a far greater degree than we have. Of course they will have their destroyers, because 'opposites' are inescapable, but some at least will have realised that the resolution of the puzzle of Nature depends on cooperation and is guaranteed by love.

If the Earth does founder, it will nonetheless have played a major role in the process towards integration. We will have done our share of spinning the flax of dark energy into bright golden light. Other conscious beings will come to understand that the future depends on will. They will be glad of our energy, they will be able to access our knowledge.

But if we are sensible, we can be amongst the survivors. We are a tiny, tiny dot in the vastness but we are held in the rippling waves of dark energy. Through many setbacks we can gain ever more control over the material universe. We can develop and expand our mental skills. With ever-increasing power we can reach out to others, link, draw closer. Waves from all the flourishing planets will spread and merge, bringing the universe gradually back to unity.

Concerning Francis Bacon, John Nichol writes[160]:

'Nowhere do we find a more exalted conception of the majesty of Nature than in Bacon's work; but he holds it as a cardinal doctrine that she is finite, that the time is at hand when all essential knowledge may be grasped, the world well won and the age of the Garden before the Fall restored.'

In a manner of speaking; yes.

Notes

Note 1 - Gödel

A *Guardian* article[3] reports that in an online paper entitled *'Gödel and the End of Physics'*, Hawking cites mathematical paradoxes devised by Gödel that cannot be solved. He argues that: *'…if there are such mathematical conundrums then there must also be physical problems, such as understanding the universe, that will also be beyond us'*. From this he concludes that no general theory is possible.

Note 2 – Speed of light

A *Guardian* leader[9] referred to a paper by Steve Lamoreaux and Justin Torgerson which argued that the speed of light has changed over time. The leader-writer comments: *'Since the speed of light is supposed to be the great invariable of the universe, this has wide implications and would contradict Einstein's theory of relativity'*

The article also comments that: *'Meanwhile, astrophysicists…have found massive galaxies much older and particles of matter spread further apart than theory and the speed of light would allow.'*

It is here counter-argued that fluctuations in the speed of light would not contradict Einstein's theory. All that matters is that the speed is constant (ie through vacuums) at any one time. Fluctuations over the ages are interesting but surely not fatal to relativity.

Note 3 – The Doppler effect

The 'Doppler effect' is the name of a phenomenon relating to changes in wavelength caused by movement of an object. Classically a railway train was used as an explanatory tool. A whistle of constant pitch emanating from the train seems to be of declining pitch to those on the platform as the train speeds ahead. The sound waves coming from the whistle are stretched out as a result of the motion. Longer wavelengths sound lower.

The same phenomenon happens with light, though of course it is colour not sound that changes. The expansion of the universe stretches the wavelength of light coming from sources moving away from us.

Note 4 - Interference

Waves, in whatever medium, have peaks and troughs. When two waves come together some of the peaks of one wave coincide with troughs of the other and the result is a loss of amplitude. If two 'highs' or two 'lows' come together they reinforce each other. This 'interference' creates a new pattern which can be recorded and examined.

Note 5 - Objectivity

Rosenblum and Kuttner explain[161] that, with Podelsky and Rosen, Einstein set out to show, in experiments with separated 'twin state' polarised photons, that there is at least an element of objective reality. However, Heisenberg reportedly[162] showed *'….that any demonstration to refute the Copenhagen interpretation's claim of observer-created reality would be frustrated.'*

Yet it would seem that there is an *element* of objectivity despite the central role played by consciousness. A sub-atomic entity in its wave-like manifestation can be 'collapsed' into particle mode by an act of observation. It is however the case that *any* observer would

have produced the same result. Further, anyone subsequently looking at the particle would see it there until the moment it moves away.

Note 6 – Cartesian mathematics

Descartes' invention of representing shapes, for example a square, by using coordinates on a grid, opened up the possibility of specifying coordinates which represent a 'theoretical' shape (ie one that cannot exist in reality). This is roughly equivalent to the idea of negative numbers. We can take away three people from a group of ten but we can't take three from nothing and have 'minus three people' as a real entity.

Alphomism forever stresses the need to match mathematical convenience against the ultimate test of perceptually 'cashing' any conclusions of the calculations.

Note 7 – Occam's razor

Occam's dictum is that if we are forming a theory we should aim for the maximum simplicity. A rough translation of the original Latin version is that; *Entities should not be multiplied unnecessarily.*

An example from the history of science is that it was believed by some that we need a substance which was known as 'phlogiston' in order to explain combustion. It would still perhaps be possible to produce an elaborate phlogiston-based theory but it clearly makes sense to use something simpler which covers all the relevant phenomena.

The Occamic policy is one which Alphomism most heartily embraces.

Note 8 – Large Hadron Collider

A 17 mile long circular tunnel has been created underground in Switzerland. It houses two parallel tubes which will be used to accelerate protons in opposite directions at velocities close to the speed of light. The protons will then be smashed together in an attempt to create smaller particles under conditions which will simulate the Big Bang. The installation is known as the Large Hadron Collider.

Note 9 – Francis Bacon

John Nichol writes[163]

'Bacon never soars away from life; he realises its complexity, its temptations, and the indefinite range of its aggregate power. Like Shakespeare, he "puts a girdle round the world;" and he has left a name to be a perennial beacon; for though in a sense one of the "infanti perduti," he has been duly enthroned among the eternal benefactors of his race.'

Note 10 - Spin

Stephen Hawking writes[164]: *'One way of thinking of spin is to imagine the particles as little tops spinning about an axis. However this can be misleading, because quantum mechanics tells us that particles do not have any well-defined axis. What the spin of a particle tells us is what the particle looks like from different directions'.*

Note 11 – John Bell

From internet site[165]

'…it was John Bell who investigated quantum theory in the greatest depth and established what the theory can tell us about the fundamental nature of the physical world.'

Note 12 - Horizon

Paul Davies explains[166] that the 'horizon' comes about because, *'…we on Earth can see very distant regions of the universe on opposite sides of the sky which are so far apart from each other that light hasn't had time to travel between them since the big bang. These regions should therefore be "causally disconnected" '.*

Note 13 - WMAP

WMAP is the acronym for the Wilkinson Microwave Anisotropy Probe. It is a satellite dedicated to producing a thermal atlas of the universe.

Note 14 – Meta analysis

Meta analysis is simply the collation of data from many experiments

Note 15 - Intuition

An interesting by-product of these experiments suggests[104] that the popular belief that women are more intuitive than men is well-founded. This is expressed by: *'While characteristic distinctions among individual operator performances are difficult to confirm analytically, a number of significant differences between male and females operator performance are demonstrable.'*

Note 16 – Psycho-kinesis

For very many years in Soviet Russia laboratory experiments were carried out into psycho-kinesis but the results were inconclusive. Perhaps it was the laboratory conditions which precluded any positive outcomes.

Note 17 - Causation

It is perhaps a satisfying paradox that it is the removal of the causal element in the relationship between mind and body which allows, via the concept of subjective energy, the causal principle to be applied otherwise throughout Nature.

Note 18 – Life on other planets

A series of Guardian headlines for articles relating to scientific attempts to find extra-terrestrial life tells a positive story:

1. 'New clue to Star Trek version of the universe' (Tim Radford, 2001)
2. 'Milky Way "may hold a billion planets like Earth" ' (James Meek, 10/04/02)
3. 'Star find raises hope for space life' (Tim Radford. 14/06/02)
4. 'Is there life out there? Almost definitely, say UK scientists' (Ian Sample, 06/06/07)
5. 'Could this be Earth's near twin? Introducing planet 55 Cancri f (Ian Sample, 07/1107)

Those who doubt the existence of other conscious beings in the universe sometimes cite the so-called 'Fermi paradox' which is not really a paradox at all but just an observation that it is strange that, if there is life out there, we have not been visited.

In 'So much space, so little time: why aliens haven't found us yet' (*The Guardian* – date not recorded) Ian Sample writes of research by Rasmus Bjork of the Niels Bohr Institute in Copenhagen. Bjork ran a computer simulation of our galaxy based on a notional eight probes from another planet, each breaking into eight smaller probes. The investigation was limited to 'the galactic habitable zone' but even so the data indicated that even if the probes were traveling at a tenth of the speed of light it would take ten billion years to explore just four per cent of the galaxy. Bjork is quoted as saying *'There are so many stars in the galaxy that probably life could exist elsewhere, but will we ever get in contact with them? Not in our lifetime'*.

Alphomism agrees that the days of contact are probably far in the future but predicts that eventually, whether by objective or subjective means, or a combination of both, we will meet our conscious companions.

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