

**The Skeptic's Sceptic:
Carl Sagan's *The Varieties of Scientific Experience: A Personal View of the
Search for God* (Penguin, 2006)
Reviewed in Four Parts by Peter S. Williams**

Part 1

Carl Sagan (1934-1996) - 'the world's best-known scientist in the late twentieth century'¹ - was Professor of Astronomy and Space Sciences, and Director of the Laboratory for Planetary Studies, at Cornell University. Sagan was an astronomer and astrophysicist well known for supporting the 'search for extra terrestrial intelligence' (SETI). He was also a Pulitzer prize-winning science communicator best known for co-writing and presenting the Emmy and Peabody award-winning 1980 PBS television series [*Cosmos: A Personal Voyage*](#), a 13-hour series seen by over 400 million people. Sagan also wrote the science fiction novel *Contact*, which formed the basis of the 1997 film of the same name.²

Sagan was a 'Skeptic', an American term that tends to designate someone who is sceptical about paranormal and supernatural truth claims, but who (so it often seems to me at least) uncritically endorses an atheistic, naturalistic worldview. Sagan was a founding member and Fellow of the 'Committee for the Scientific Investigation of Claims of the Paranormal' (CSICOP), and a member of the Council for Secular Humanism's International Academy of Humanism. Sagan nevertheless resisted the atheist label, describing himself as an agnostic and writing that: 'There is no necessary conflict between science and religion.'³ He also questioned Skepticism's frequently antagonistic strategy:

'The chief difficulty I see in the sceptical movement is in its polarization: Us vs. Them – the sense that we have a monopoly on the truth; that those other people who believe all these stupid doctrines are morons.'⁴

However, Sagan did argue against the intellectual rectitude and truth of theism, and is thus lauded by many atheism-promoting groups and individuals today. For example, endorsing *The Varieties of Scientific Experience*, atheist Sam Harris writes:

'An unrivalled master at communicating the breadth and beauty of science. It is not an accident that he was also one of the 20th century's most incisive critics of popular delusion. In *The Varieties of Scientific Experience*, the transcript of Sagan's Gifford Lectures, Ann Drydan has unearthed a treasure. It is a treasure of reason, compassion, and scientific awe. It should be the next book you read.'⁵

It is my contention that Sagan's Gifford Lectures, published to commemorate the tenth anniversary of his death, are anything but the 'treasure of reason' Harris depicts.

Sagan's Gifford Lectures

The Gifford Lectures were established by the will of Adam Gifford (d. 1887) to 'promote and diffuse the study of Natural Theology in the widest sense of the term —

in other words, the knowledge of God.’⁶ These prestigious lectures (which are not necessarily either *pro* or *anti* knowledge of God), given at Scottish Universities, are often given with a view to publication. Several of these works have become classics in the fields of theology and/or philosophy. Past lecturers include such notables as: Arthur Balfour, William Temple, Basil Mitchell, Richard Swinburne, Peter van Inwagen and John Haldane. Philosopher William James delivered *The Varieties of Religious Experience* as Gifford Lectures in 1900-02. Sagan’s lectures were originally delivered under the title *The Search for Who We Are*, but are now released with a title that plays off this famous predecessor.

In *The Varieties of Scientific Experience: A Personal View of the Search for God* (Penguin, 2006), Sagan’s 1985 Gifford Lectures finally see the light of day in a handsomely presented and illustrated book. The ‘time dilation’ effect involved is doubly telling. In the first place, given the recent vogue for vehemently anti-religious polemics (by the ‘New Atheist’ likes of Richard Dawkins⁷, A.C. Grayling,⁸ *et al*), Sagan’s book comes as a breath of fresh air from a time when the atheistic pole of the God debate was a good deal calmer and more balanced than it has been of late. Sagan views theism as an understandable intellectual mistake, but one with significant practical benefits overall. In the second place, twenty-two years of scientific investigation since 1985 have left many of Sagan’s scientific speculations buried under the weight of contrary evidence.

Sagan covers four main topics:

- 1) The significance of life on Earth given modern knowledge of cosmology
- 2) The origin of life and the possibility of extra-terrestrial intelligence
- 3) Natural theology (arguments for theism aside from revelation)
- 4) Religious experience

Accordingly, I shall divide my review into four parts, beginning with Sagan’s treatment of the place of humanity in the cosmos.

An Epistemic Aside

It is, however, worth observing at the outset that Sagan embraces the self-contradictory theory of knowledge (epistemology) that:

‘superstition is... merely belief without evidence.’ (p. 1)

If ‘belief without evidence’ is automatically ‘superstition’, then we are all of us, including Sagan, very superstitious. Every argument rests on logical principles that brook no support (on pain of begging the question), and every empirically grounded statement depends upon the assumed reliability of perceptual practices that are likewise impossible to justify without circularity. Evidence is important, but it is not the be-all and end-all of rationality. Indeed, one cannot coherently celebrate the undoubted virtues of evidential arguments *unless* one also celebrates the virtues of appropriate belief without evidence. It would therefore be better to say that superstition is *belief despite an overwhelming evidential case to the contrary* or *belief formed without proper regard for relevant epistemic duties*.

Sagan quotes Bertrand Russell with approval, asserting that: ‘it is undesirable to believe a proposition when there is no ground whatever for supposing it true.’ (p. 189) In the revealing selected Q&A session a questioner sensibly asks: ‘What grounds would you have for believing that proposition?’ (p. 249) Sagan admits the logical flaw, but instead of retracting his epistemology, flounders on:

‘Yes. That’s a very good question that leads to an infinite regress... So if you wish to have the statement justified in internal logic – that is, a self-consistent closed system – obviously it cannot, because it leads to an infinite regress. But as I was saying, it seems to me that the approach of sceptical scrutiny commends itself to our attention because it has worked so well in the past.’ (p. 249)

Thus Sagan admits that his epistemology is incoherent, but instead of abandoning his self-contradictory and self-excepting position, attempts to justify it with an inference from pragmatic results! Thankfully for the cause of rationality, the proposition that ‘it is undesirable to accept any belief formed without proper regard for relevant epistemic duties’ is not merely logically consistent, but more pragmatically useful if one’s goal is the truth rather than simply the best metaphysically naturalistic explanation presently available.

Space is Dark and Large, and we are Small by Comparison...

Sagan begins by observing that most of the cosmos is dark. He equates darkness with nothingness: ‘I stress that the universe is mainly made of nothing, that something is the exception. Nothing is the rule.’ (p. 2) Strictly speaking, this is incorrect, since even a *dark* something is very much a dark *something* (in this case the space-time continuum itself).

Looking at the Solar System, Sagan announces that ‘there are four large bodies other than the Sun’ (p. 5) and pronounces that ‘the rest is debris’ (p. 5). Unfortunately, ‘debris’ carries connotations of insignificance that are not necessarily accurate. Suppose ten chunks of rock had fallen off a cliff (perhaps due to natural weathering), of which five were much larger than the rest; and suppose that one of the smaller rocks had been sculpted into a bust of Carl Sagan. Would it be accurate to describe the sculpted rock as a ‘piece of debris’ (p. 5)? Obviously, the answer is ‘yes’ (in one sense) and ‘no’ (in another). Likewise, whether or not Earth is ‘debris’ depends on factors besides its size or the origin of the material of which it is made.⁹

Sagan is soon asserting: ‘the world that we live on is a tiny and insignificant part of a vast collection of worlds.’ (p. 11) Earth may be tiny relative to Saturn and Jupiter, but unless significance is proportional to size, there is no justification in this fact for the assertion that Earth is insignificant. And significance is unrelated to size. Cars are bigger than humans, but humans are more significant than cars. Indeed, some humans are larger than others, but that doesn’t make them more significant. Sagan’s implicit argument for the insignificance of Earth (and hence the insignificance of life on Earth) is ‘size-ist’.

C.S. Lewis pointed out that although our scientific model of creation may have changed:

‘The insignificance (by cosmic standards) of the Earth became as much a common-places to the medieval, as to the modern, thinker; it was part of the moralists’ stock-in-trade, used, as Cicero uses it, to mortify human ambition.’¹⁰

For example, Moses Maimonides, writing in his *Guide for the Perplexed* in the 12th century, wrote:

‘if man examines the universe as he understands it, he knows how small a part of it he is... mankind and certainly all other species of living things are naught in comparison with all of continuing existence.’¹¹

In point of fact, Earth is larger than the average sized thing in the cosmos (and people are in the average size band, between the microscopic and the macroscopic levels).

Earth may be but one world in ‘a vast collection of worlds’ (p. 11), and our Sun may be ‘one of a vast multitude’ (p. 11) – but neither are at all ‘average’. We now know that when Sagan states that ‘the average star is in no major way different from the Sun’ (p. 23) he is wrong. As Benjamin Wiker reports:

‘Our sun is not a typical star but is one of the 9 percent most massive stars in our galaxy, and is also very stable. Further, the sun hits the Goldilocks mean for life – neither too hot (like a blue or white star) nor too cold (like a red star) – and its peak emission is right at the visible part of the electromagnetic spectrum – the very, very thin band where not only vision is possible but also photosynthesis.’¹²

Even if Sagan didn’t have the scientific facts wrong here, is an average student with average looks, average grades and average interests thereby *insignificant*? Just as there is no inherent relationship between significance and size, so there is no inherent relationship between significance and mediocrity in the mathematical sense.

God and the Copernican Myth of Insignificance

Sagan thinks that modern scientific knowledge that we are not ‘in the centre of the galaxy, where things are clearly important’ (p. 24) has negative implication for theism (although quite what the implication is meant to be is never spelt out). According to Sagan, Earth is:

‘somewhere out in the galactic boondocks, the extreme suburbs, where the action isn’t. We are situated in a very unremarkable, unprepossessing location in this great Milky Way Galaxy.’ (p. 24)

The implicit argument here seems to be something like this: the belief that humans are significant is a corollary of theism that is, somehow, falsified by the empirical observation that we don’t live in the centre of the cosmos. This ‘somehow’ is to be cashed out as the principle that significance is related to location (that the ‘centre of the galaxy’ is ‘where things are clearly important’) and that our failure to inhabit this

central location therefore implies our lack of metaphysical significance, and thereby entails that theism is false.

Sagan presents us with a lovely turn of phrase, but a terrible argument that suffers from multiple problems. For instance, as far as we know we *are* the only action in the cosmos, at least as far as intelligent life goes, and hence, by definition, the action is wherever we are. We are not in the centre of the Galaxy. Therefore, the action is *not* in the centre of the galaxy. It's *here*. In other words, all the available evidence is *against* the principle that significance is related to the centrality of one's location in space.

It should be obvious that the link between location and significance presupposed by Sagan's argument is non-existent. Is someone standing in the middle of a room necessarily more important than someone leaning against one of the walls? Is the centre of a sphere more important than its surface? The importance of a thing has nothing to do with its spatial position. As Keith Ward writes: 'It does not follow that, just because we are not physically at the centre of the universe, we are not central to God's plans.'¹³

The picture of the cosmos developed by the ancient Greeks (principally Aristotle and Ptolemy) had Earth in the middle being circled by a series of nested, concentric spheres containing the planets and the stars. At first this model was a good fit with the available evidence. Over the years various observations were made that didn't fit this model, but which could be made to fit by adding circles within circles (called 'epicycles') in order to obtain ever more complex and accurate movements from the heavenly bodies. Eventually, astronomers like Copernicus (1473–1543) argued that the old model was needlessly complicated, and that it was simpler to suppose that the Earth and the other planets were orbiting the Sun. This shift, from a model with Earth at the centre to one with the Sun at the centre, is known as 'the Copernican revolution'.

Ironically, Sagan's 'locationist' argument actually depends upon a false metaphysical principle relating significance to location, a principle skeptics like Sagan misattribute to the Christians who opposed the Copernican Revolution, a principle that the Christians who made the Copernican Revolution would not have accepted, but which Skeptics themselves apparently believe (at least when presenting arguments against theism). In the pre-Copernican scheme of things, the centre of the universe was seen more as the dumping ground at the bottom, rather than the nerve-centre at the heart of the universe. Sagan is wrong to think of the Ptolemaic view regarding Earth as a universal high point that Copernicus reduced to lowly insignificance. As philosopher Robert C. Koons argues:

'It is sometimes thought that our displacement from the centre of the universe by Copernicus somehow contradicted at least Christian theism. But this seems to be based on the erroneous assumption that everything believed by ancient Christians was taken by them as equally essential to their theology. Ancient Christians knew that the earth was spherical and that the universe is immensely large compared to the earth. And although they all believed (until about the fourteenth century) that the earth was the centre of the universe, they did not think that there was anything special about being there, since it was

hell, rather than the terrestrial surface, that lay at the very centre. From the ancient perspective, it was the periphery of the cosmos, and not the centre, that took pride of place. The outermost sphere was the source of all terrestrial life and motion. The centre was a kind of sump in which all that was gross and base settled.’¹⁴

Nancy Pearcey and Charles Thaxton explain:

‘in medieval cosmology the centre of the universe was not a place of special significance. Quite the contrary, it was the locus of evil. At the very centre of the universe was Hell, then the earth, then (moving outwards from the centre) the progressively nobler spheres of the heavens. In this scheme of things, humanity’s central location was no compliment, nor was its loss a demotion. In fact, in Copernicus’s own day a common objection to his theory was that it elevated mankind *above* his true station. In medieval cosmology, human significance was rooted not in the earth’s central location but in the regard God shows toward it. Hence the idea that Copernican theory threatened the Christian teaching of human significance is an anachronism.’¹⁵

For example, Galileo, through his literary mouthpiece (Salvati) argued that the Copernican revolution actually *promoted* humanity:

‘we seek to ennoble and perfect [the earth] when we strive to make it like the celestial bodies, and, as it were, place it in heaven, from which your philosophers [i.e. Aristotle] have banished it.’¹⁶

Indeed, Sagan flatly contradicts his own Copernican argument against theism. Under the pre-Copernican scheme, Sagan observes that ‘The Earth... had all the corruption of the universe localized here.’ (p. 36); and yet *in the very next paragraph* Sagan asserts that in the Copernican scheme: ‘the Earth was demoted.’ (p. 36)

Sagan contradicts his Copernican argument in another way as well, in the very act of attempting to push the supposedly sharp blade of his argument deeper into the heart of theism:

‘there was the hope that, well, at least maybe our galaxy was at the centre of all the other galaxies, all those many billions of other galaxies. But modern views have it that there is no such thing as a centre of the universe...’ (p. 37)

Do you see what is going on here? In the first sentence Sagan invokes the (false) principle that significance is related to location, and that centrality equals significance whereas non-centrality equals insignificance. He thereby implies that we are insignificant because *not even our galaxy is in a central location*. In the second sentence Sagan informs us that: ‘there is no such thing as a centre of the universe’. But *if there is no central location in the universe then there cannot possibly be any non-central location in the universe!* Sagan says:

‘one of the central points of special relativity is that there are no privileged frames of reference, that we are not in an important position or state of motion.’ (p. 40)

But if there are ‘no privileged frames of reference’, then not only is the concept of an ‘important’ or ‘privileged’ position incoherent, *so is the concept of a non-important or under-privileged position!*

Contemporary science actually stands Sagan’s ‘Copernican’ objection on its head; for we now know that the great age, and hence size of the universe in comparison with Earth, as well as the non-central solar and galactic location of Earth, are just some of the many finely-tuned physical preconditions for the existence of life that make the here and now of planet earth very special indeed.¹⁷

The Galileo Affair

Talking of Galileo (as we were a little while back), when Sagan comments that ‘The Catholic Church threatened Galileo with torture if he persisted in the heresy that it was the Earth that moved and not the Sun and the rest of the celestial bodies’ (p. 37-38), he is invoking a myth beloved by skeptics. Galileo’s problems with the Catholic inquisition stemmed not so much from a conflict between ‘science’ and ‘faith’ as from a conflict of personalities on the one hand, and a conflict with the scientific mainstream of his day on the other.

In the first place, historian of science Ronald Numbers explains that Galileo: ‘had gone out of his way to insult the Pope [Urban VIII], who had previously supported him. He put the Pope’s favourite argument against heliocentrism into the mouth of the character Simplicio - the simple-minded person’¹⁸ in his *Dialogue on the Great World Systems*. As J. Bronowski comments: ‘It may be that the Pope felt Simplicio to be a caricature of himself; certainly he felt insulted.’¹⁹ As a result Galileo:

‘was summoned down to Rome by the Inquisition [and] lived in the Tuscan palace. And then when he was asked to move into the Vatican, to the palace of the Inquisition, one of the officials in the Inquisition vacated his three-room apartment so that the distinguished guest, Galileo, could have a nice apartment. And they allowed him to have his meals catered by the chef at the Tuscan embassy. Ultimately, he was under house arrest in his villa outside of Florence... for his theological heresies, not for his Copernicanism. He happened to be a Copernican, but that’s not what got him into trouble.’²⁰

In the second place, as Steve Fuller recounts:

‘Galileo, that 17th century icon of scientific heroism, overplayed his hand by fabricating experimental results and embellishing observational accounts... Even Galileo’s most sympathetic critics found his appeal to the telescope as a scientific instrument rather puzzling. He lacked any principled explanation – a theory of optics – for how this Dutch toy, essentially a spyglass, enabled him to see lunar craters and sunspots. Moreover, the lenses that Galileo improvised for his own telescope were so full of distortion that observers not already convinced of his interpretation could make little sense of what they saw through them.’²¹

While the Catholic church of the period certainly doesn't come out of the Galileo incident smelling of roses, the 'science' verses 'faith' portrayal of the affair beloved by Sagan *et al* is historical revisionism plain and simple.

Is Earth Just 'One of Many'?

According to Sagan, the Copernican revolution threatens belief in human significance by opening up the way for doubt about the Earth being *the* Earth:

'You know the phrase... *the* world, or *the* Earth. What is the definite article saying? It's saying there is only one. And that goes straight back to pre-Copernican times... if Copernicus were right, then the earth would be demoted, no longer *the* Earth, *the* World, but just *a* world, *an* earth, one of many.' (p. 36-37)

Of course, the mere existence of other planets (something we have known about for a rather long time – in our own solar system at least) does not mean that the Earth is not a special, or an unusual place. The Earth is still, to the best of our knowledge, *the* Earth. Show me another! Unfortunately, the philosophical belief that Earth is not special in any way, a belief accepted and in no small part propagated by Sagan, continues to warp scientific investigation of the cosmos and the presentation such exploration receives in the media.

A 'New Earth'?

On Wednesday April 25th 2007 various news media made a song and dance over the discovery of Gliese 581c:

'a planet outside our solar system that is potentially habitable, with Earth-like temperatures, a find researchers described Tuesday as a big step in the search for "life in the universe."²²

However, a big step does not a completed journey make. Just how 'habitable' is 'habitable', and just how 'Earth-like' is 'Earth-like'? Well, as Seth Borenstein of the associated press admitted: 'There's still a lot that is unknown about the new planet, which could be deemed inhospitable to life once more is known about it...²³

Borenstein observed:

'it's worth noting that scientists' requirements for habitability count Mars in that category: a size relatively similar to Earth's with temperatures that would permit liquid water. However, this is the first outside our solar system that meets those standards.'²⁴

Of course, as far as we know, Mars is lifeless (at best it may support some bacteriological life – life that may have transferred there from Earth). Moreover:

'Based on theory, 581c should have an atmosphere, but *what's in that atmosphere is still a mystery and if it's too thick that could make the planet's surface temperature too hot...* "You need more work to say it's got water or it

doesn't have water," said retired NASA astronomer Steve Maran, press officer for the American Astronomical Society...²⁵

Gliese 581c (in the constellation of Libra) has an orbit that would permit liquid water *if* there is H₂O and *if* it has the right sort of atmosphere. David Charbonneau of the Harvard-Smithsonian Center for Astrophysics in Cambridge Massachusetts comments:

*'If the planet is a rocky super-Earth, then perhaps it has a surface with liquid water and life... If instead the planet is a "sub-Neptune", then it would have a large gas envelope that buries the surface below, making it inhospitable for life.'*²⁶

As Sara Seager, a planet expert at the Massachusetts Institute of Technology, said: *'if the planet had an atmosphere more massive than Venus', then the surface would likely be too hot for liquid water.'*²⁷

The *Daily Mail* newspaper made the discovery of Gliese 581c front page news, proclaiming:

'The New Earth - does the discovery of a planet just like ours means there IS life out there?'

This is tabloid sensationalism. The third planet orbiting Gliese 581 is *not* 'just like ours' and does *not* qualify as a 'new earth'. The article by *Daily Mail* science editor Michael Hanlon is a little more down to earth (if you'll excuse the pun), because it does put in some qualifications, such as that this is:

*'possibly the most extraordinary world to have been discovered by astronomers... The Earth-like planet that could be covered in oceans and may support life... It probably has a substantial atmosphere and may be covered with large amounts of water - necessary for life.'*²⁸

Nevertheless, the tone of the article is so upbeat that only careful readers are likely to spot the true significance of the occasional 'could' and 'may'. Large print announces: 'evidence that life - just like us - might be out there.'²⁹ However, the simplistic leap from 'there may be water' (given the right sort of atmosphere) to 'there may be life' flies in the face of all the evidence. Water is necessary for life, but (as we'll see in Part II) there's a lot more to life than water! Hanlon does at least admit: 'If there is life there it would have to cope with the higher gravity and solar radiation from its sun', and that: 'Just because Gliese 581c is habitable [which can mean being like Mars] does not mean that it is inhabited.'³⁰

While the *Daily Mail* may be thinking in terms of life 'just like us', even those scientists who think there may be life on 581c are generally thinking in terms of *microbial* life. In point of fact, there is currently a lack of the evidence we'd expect if 581c was inhabited by a technologically advanced civilization: 'According to Seth Shostak, of the Search for Extraterrestrial Intelligence Institute in California, the Gliese system is now a prime target for a radio search. "We had actually looked at this system before but only for a few minutes. We heard nothing..."³¹ What if we look

again and still find nothing? Will this count as evidence against the philosophical assumptions about an easy origin of life and evolution of intelligent life that underpin much SETI research? After all, this is the best candidate for ET's home so-far discovered: 'its sun is an ancient star - in fact, it is one of the oldest stars in the galaxy, and extremely stable. If there is life, it has had many billions of years to evolve.'³² On this point, it is interesting to note Hanlon admitting:

'We don't understand how life began on our world, let alone how it could arise anywhere else. There may be an awful lot of bugs and bacteria out there, and only a few worlds with what we would recognize as plants and animals. Or, of course, there may be nothing.'³³

If we don't understand how life began (within a non-teleological framework), then it is surely premature to be making statements about life on 581c supported by nothing besides the *possibility* that there *may* be liquid water there, *if* it doesn't have the wrong sort of atmosphere!

Darwinist Nick Matzke cautions:

'A planet that massive might have the problem of being so smooth it has a global ocean, which probably would make it tough to produce the concentration mechanisms (evaporation in pools etc.) that might be required for the origin of life...'³⁴

Astronomer Guillermo Gonzalez is similarly downbeat concerning the chances of life on Gliese 581c:

'the host star being an M dwarf [poses] problems for habitability. The smallest planet's eccentricity is comparable to that of Mercury, so it is probably locked into a 3:2 spin-orbit resonance. So [581c] will experience large temperature variations over the course of its orbit. What's more, because its rotation is slower, it should have a weaker magnetic field and be subject to enhanced solar wind stripping of its atmosphere. Finally, the fact that it has a mass at least 5x Earth's means that it will have a high surface gravity and less surface relief than the Earth - meaning no dry land.'³⁵

Gliese 581c is the first non-Gas giant discovered within the so-called 'goldilocks' zone of 'habitable' orbits around its star. Hence it *might* have a temperature in the right 'goldilocks' zone, depending on what the atmosphere is like. *If* it does have the right temperature, then it might have liquid water, which is another necessary condition for life. However, the recipe for life is more complicated than 'a big rock, liquid water and a star plus time'; and even if 581c has liquid water, it suffers from several habitability drawbacks (including large temperature variations, inadequate shielding against the solar wind from its M dwarf star that would strip away its atmosphere, and high gravity³⁶). More recently:

'simulations of the climate on Gliese 581c created by Werner von Bloh of the Institute for Climate Impact Research in Germany and his team suggest the planet is no Earthly paradise, but rather a faraway Venus, where carbon dioxide and methane in the atmosphere create a runaway greenhouse effect

that warms the planet well above 212 degrees Fahrenheit (100 Celsius), boiling away liquid water and with it any promise of life.’³⁷

Serious Odds

Astronomer Hugh Ross lists 200 parameters required for a life-bearing planet. Comparing the chances of a planet falling within all of these parameters by chance alone with our best estimate of the total number of planets in the universe (10^{22}) he estimates that there is ‘less than 1 chance in 10^{215} ’ of even one habitable planet existing in the universe.³⁸ Elsewhere, Ross argues:

‘fewer than a trillionth of a trillionth of a percent of all stars will have a planet capable of sustaining advanced life. Considering that the observable universe contains less than a trillion galaxies, each averaging a hundred billion stars, we can see that not even one planet would be expected, by natural processes alone, to possess the necessary conditions to sustain life.’³⁹

Offering ‘a revised Drake equation’ for calculating the number of intelligent civilizations in our Galaxy (more about the ‘Drake equation’ in Part II), astronomer Guillermo Gonzalez and philosopher Jay W. Richards conclude:

‘the probability that the Milky Way Galaxy contains even one advanced civilization is likely to be much less than one. This is an interesting result, of course, since we exist.’⁴⁰

Astrobiologists Peter D. Ward and Donald Brownlee agree:

‘If some god-like being could be given the opportunity to plan a sequence of events with the express goal of duplicating our “Garden of Eden”, that power would face a formidable task. With the best intentions, *but limited by natural laws and materials*, it is unlikely that Earth could ever be truly replicated.’⁴¹

The fact that we exist, then, naturally suggests the hypothesis that the causes of our existence were not limited to natural laws and materials.

Burnt to a Crisp?

Looking forward, Sagan predicts that the Earth will one day be burnt to a crisp by the aging sun as it expands, and he suggests that this negative implications for the belief that humans were created on purpose:

‘Some 5 or 6 or 7 billion years from now, the Sun will become a red giant star and will engulf the orbits of Mercury and Venus and probably the Earth... it is not our most pressing problem. But it is something to bear in mind. It has theological implications.’ (p. 20.)

Presumably the underlying thought here is that if life on Earth is special to its Creator then the Creator surely would not allow it to be extinguished, and that since it would seem that life on Earth will be extinguished in a few billion years time, the obvious

conclusion it that life on Earth is not in fact special to its Creator, perhaps because it doesn't have one after all. However, *neither conclusion is at all obvious*. Indeed, I'm not convinced that such an event would have any theological implications – unless one thinks that biblical Christianity predicts that humans never settle off-world. But nor am I convinced that such an event *will* happen.

Of course, such an event will happen *if* the universe continues to exist (and to run according to the known laws of physics) for long enough. But whether or not the universe does *that* is, for the theist, something very much in the hands of its Creator, who is thought by them to sustain the universe in existence from one moment to the next. Hence, if one does think the bible predicts that people will not leave Earth before the creation of 'the new heavens and earth', one would then be left pitting one inference (to the conclusion that God will bring cosmic history to an end before 5-7 billion years are up) against another inference (that God will not bring cosmic history to an end before 5-7 billion years are up). As Sagan writes in the similar context of the possibility that humanity will destroy itself in a nuclear war:

'we would have to conclude either (a) than an omnipotent and omniscient God did not create the universe, that is, that He was an inexpert cosmic engineer, or (b) that human beings will not self-destruct. Either alternative, it seems to me, is a matter of some interest, would be worth knowing.' (p. 59)

Sagan's reason for preferring the anti-Christian (though not exactly anti-theistic) fork of this dilemma, that 'there is a dangerous fatalism lurking here' (p. 59), is plainly *question-begging*. If Christianity entails that humanity as a species will not destroy itself, or be destroyed, then accepting this prediction would constitute a 'dangerous fatalism' (one that might lead to our destruction) *only if Christianity is not true*. Besides which, multiple forms of self-interest would surely mitigate against Sagan's (hypothetical) 'dangerous [optimistic] fatalism', since this does nothing to guarantee individual, or familial, or national, or racial survival.

It will be a long time before we are in a position to empirically demonstrate which prediction - that God will bring cosmic history to an end before 5-7 billion years are up or that that God will not bring cosmic history to an end before 5-7 billion years are up - is correct. Besides which, the latter prediction admits of multiple interpretations; ranging from the reading of scripture requiring the predicted cap to cosmic history simply being mistaken, to Christianity's being false, through to Atheism being true. Since we're currently 5-7 billion years off even needing to debate which of these interpretations is the most plausible, I think we can afford to let sleeping dogs lie.

Conclusion

In Part I of this review we have seen that Sagan invests in arguments to the effect that modern scientific knowledge should disabuse us of the theistic notion that humans and the planet we inhabit are special or significant parts of the cosmos, and should thereby disabuse us of any theistic belief which entails that humans are significant in the sight of God. Each and every one of these arguments is based upon implausible philosophical claims - such as that metaphysical significance is related to physical size or location.

Moreover, advances in scientific knowledge since 1985 have shown that several of Sagan's empirical premises (such as that the Sun is an average star) are simply incorrect. Indeed, Sagan himself explicitly affirms scientific views that undermine his argument from the 'non-centrality' of the Earth in the cosmos (i.e. that there is no 'centre' of the cosmos).

Finally, the exact same evidence that Sagan seeks to use in establishing the insignificance of life on Earth (e.g. Earth's life-crucial non-central location in our galaxy) actually justify a multi-factorial 'anthropic principle' that many see as grounding a strong argument to precisely the *opposite* conclusion.

Recommended Resources

Carl Sagan Portal @ www.carlsagan.com/

Wikipedia: Carl Sagan @ http://en.wikipedia.org/wiki/Carl_Sagan

Russell Blackford, 'Are there aliens out there? Don't bet on it yet' @ <http://ieet.org/index.php/IEET/more/blackford20070429/>

Guillermo Gonzalez, 'Real Estate Sale: High-Gravity Water-World with Weak Magnetic Field and Large Annual Temperature Fluctuations' @ www.evolutionnews.org/2007/04/real_estate_sale_highgravity_w.html

Benjamin Wiker, 'Does Science Point to God?' @ www.arn.org/docs2/news/doessciencepointtogod040903.htm

Video:

Carl Sagan Videos @ <http://technorati.com/videos/tag/Carl%20Sagan> & www.youtube.com/results?search=related&search_query=Carl%20Sagan%20Cosmos&v=pMHNnhAE DN4

The Privileged Planet (Illustra Media); available on-line @ www.theapologiaproject.org/media/the_privileged_planet.ram

Books:

Guillermo Gonzalez & Jay Richards, *The Privileged Planet: How Our Place in the Cosmos Is Designed for Discovery*, (Regnery, Jan. 2004)

Peter D. Ward & Donald Brownlee, *Rare Earth: Why Complex Life Is Uncommon in the Universe*, (Copernicus, 2000)

Part II

Having examined Sagan's thoughts on the significance of life on Earth given modern knowledge of cosmology in Part I of this four part review, our attention now turns to his speculations about the origin of life and extra-terrestrial intelligence.

Following on from his thoughts about the Earth being 'burnt to a crisp' in the distant future, Sagan raises a wider speculative argument in the traditional 'problem of evil' mould:

'if, as I will speculate later, life and perhaps even intelligence is a cosmic commonplace, then it must follow that there is massive destruction, obliteration of whole planets, that routinely occurs, frequently, throughout the universe. Well, that it a different view than the traditional Western sense of a

deity carefully taking pains to promote the well-being of intelligent creatures.’
(p. 28-29)

In syllogistic form:

- 1) If intelligent life is commonplace in the universe then, given the way the universe works, intelligent life must get routinely obliterated
- 2) Intelligent life is commonplace in the universe
- 3) Therefore, intelligent life must get routinely obliterated
- 4) If God were all-knowing and all-powerful and all-good, then intelligent life would not get routinely obliterated
- 5) Therefore, God cannot be all-knowing and all-powerful and all-good

Sagan recognizes that the ‘problem of evil’ is not an argument against theism *per se*, for his conclusion is that whether one can find ‘Him in the shining of the stars’ (a quote from Tennyson): ‘depends on who the Him is.’ (p. 29) That is, perhaps ‘God’ exists but doesn’t care much for intelligent life (isn’t ‘all-good’). But what of Sagan’s argument for this limited conclusion? It seems to me that all three of his crucial premises (1, 2 & 4) are suspect.

Supposing premise 4 is correct (an assumption I will question in a little while), anyone with reason to believe in the existence of God would deduce that premise 1 is false. Of course, *if* intelligent life is commonplace *and* the universe is allowed to blindly impinge upon the existence of intelligence, *then* much of that intelligence might well meet its end in the unfeeling mechanism of the cosmos. But what if God does *not* allow the universe to blindly impinge upon the existence of intelligence, but miraculously preserves intelligent life in existence? It is hard to dispute the *possibility* of miracles *if* God exists. Hence, in assuming that intelligent life will not be miraculously preserved against the laws of nature when they threaten it, premise 1 is guilty of begging the question against theism.

But why, exactly, is the routine obliteration of intelligent life incompatible with God being all-knowing and all-powerful and all-good (premise 4)? After all, on an individual level I don’t find the fact that one day *my* intelligence will be ‘obliterated’ from the universe incompatible with my belief in God. Indeed, if I were never ‘obliterated’ from the universe I would have to live in this universe for eternity – a fate I find far worse than going to heaven. The point here is that on a theistic worldview death (despite the heartbreaking severing of human relationships it involves) needn’t be seen as the *absolute* and *final* tragedy that it is on a naturalistic worldview. The theistic worldview opens up at least the possibility of life after death. Sagan’s argument seems to illegitimately import a naturalistic view of death into proceedings.

Sagan thinks that an immortal creator who creates mortal creatures is by definition: ‘a cruel god... If He’s omniscient, He could be kinder and create immortals, secure from the danger of death.’ (p. 29). However, the only way to provide essentially embodied intelligences with immortality without fear of *physical* death is to create them in an environment inimical to the full exercise of free will. Christian theism at least holds out the hope of an eternal embodied life without the sinful misuse of free will to essentially embodied creatures who are allowed to choose whether or not to forgo use

of the full range of freedom available to them by being transposed into such a state of being after death. And whatever God's reasons for creating this universe, Christians believe that in the person of Jesus God himself was actually born, lived, and suffered a horrible death on our behalf.

Finally, and perhaps most importantly, Sagan's argument depends upon the premise that intelligent life is commonplace in the universe – and this premise can be denied with a greater degree of confidence today than was the case twenty-two years ago when Sagan delivered his lectures. And if this premise is false, Sagan's argument doesn't even get off the ground.

From the Origin of Life Here to the Existence of Life Out There

Sagan's argument for the crucial premise that intelligent life (or at least life) is commonplace comes in two steps. In the first step, Sagan argues that life on Earth began naturalistically and rather easily. In the second step, he argues that it is reasonable to expect this naturalistic process to operate whenever opportune conditions exist, and that it is reasonable to think that our universe offers a multitude of opportune conditions.

According to Sagan:

‘as science advances, there seems to be less for God to do. It's a big universe, of course, so He, She or It could be profitably employed in many places. But what has clearly been happening is that evolving before our eyes has been a God of the Gaps; that is, whatever it is we cannot explain lately is attributed to God. And then after a while, we explain it [without reference to God], and so that's no longer God's realm. The theologians give that one up, and it walks over onto the science side of the duty roster... Well, I want to describe one of the most major gaps that is in the course of being filled in. (We cannot surely say it is fully filled in yet.) And that has to do with the origin of life.’ (p. 64)

A great many questionable assumptions underlie this passage – such as the assumption that ‘theologians’ always attribute things they don't understand to God's primary causal activity (they do not); the assumption that when science explains something in terms of secondary causes (natural causes that the theologian would ultimately attribute to God) ‘that's no longer God's realm’ (of course it is); and the assumption that scientific explanations must, by definition, exclude God's primary causal activity (it needn't).

For example, one can distinguish between ‘Empirical Science’ and ‘Historical Science’:

‘empirical science is a non-historical, empirical approach to the world that focuses on repeatable, regularly reoccurring events or patterns in nature... By contrast, historical science is historical in nature and focuses on past singularities that are not repeatable...’⁴²

Empirical science deals with physical processes that and can be studied *directly* and/or *repeatedly* in the present (e.g. laws of nature, such as gravity). Historical

science deals with phenomena which are non-repeatable, and which can therefore only be studied *indirectly* in the present:

‘Advocates of this distinction claim that appealing to God [i.e. miracles] is legitimate in historical science even if illegitimate in empirical science, because [historical science] deals with cases where, theologically speaking, God’s primary causal activity is to be found, while [empirical science] deals with God’s secondary causal activity.’⁴³

Indeed, philosophers of science have found it impossible to provide a sustainable definition of science which prevents appeals to either intelligent or supernatural causes from counting as a legitimate aspect of scientific theory making (the former is after-all an explanation that features in many mainstream scientific fields). Historical sciences positing empirically detectable intelligent design (which may be philosophically interpreted as divine design), or even explicitly theistic origin theories (e.g. various types of creationism), may or may not be *good* science, but there is no adequate justification for the view that they are *not* science.⁴⁴ As Dominic J. Balestra, Professor of Philosophy at Fordham University in New York writes:

‘the last twenty-five years of scientific discussions about origins, and the new, post-Kuhnian philosophy of science, present a significantly transformed context [which] removes an old barrier (the hard demarcation) between science and theology and, thereby, clears a way for new avenues of exchange between these disciplines... [This is] a time when the results of science in cosmology and biochemistry have produced findings salutary to religion, and philosophy of science has removed old walls of separation...’⁴⁵

While some people still attempt to exclude theories of design from science by erecting methodological rules, most philosophers of science recognize such rules as being arbitrary and as getting in the way of the principle goal of science, which is to pursue the truth about reality. Philosophically naïve demarcation criteria should not prevent scholars from following evidence from cosmology and biochemistry when it points in the direction of design, even if the other side of the elephant marked ‘intelligent design’ might be marked ‘God.’ Writing about the ‘old walls of separation’, Balestra comments:

‘Because certain types of explanations (for example, moral duty as an explanation for someone’s behaviour) are ruled out of science for methodological reasons, it does not follow that such explanations *tout court* do not contribute to our understanding... [Hence] The issue of scientism stands in a critical intellectual juncture between science and theology...’⁴⁶

In other words, having a rule that excludes a certain type of explanation from science (e.g. explanation in terms of design) does nothing to justify the conclusion that such an explanation is not in fact the best explanation, or indeed, the true explanation, for a given set of data. Hence, even were it not the case that ‘Most philosophers of science have abandoned the quest for demarcation...’⁴⁷, given that it is logically possible for an explanation in terms of design to be the best explanation for a given set of data *tout court* - indeed, if design might be the *true* explanation - then one must admit that

science defined so as to exclude explanations in terms of design is neither a search for the best explanation, nor a search for truth! The only alternative to such an admission is to allow scientists *as scientists* to *follow the evidence as far as it leads them*, even if it leads them to the conclusion of design.

The ‘god-of-the-gaps’ is God proposed as an explanation for gaps in the current scientific account of creation *simply on the grounds that no non-teleological scientific explanation is currently available*. However, the phrase is often used to caution against the fragility of belief in God based merely on the provision of explanations for natural phenomena or for aspects of current scientific theories. For example, rather than positing God to explain why there are reliable laws of physics in the first place, or why those laws are ‘fine-tuned’, Newton posited a ‘god-of-the-gaps’ to explain why planets don’t fall into the sun (i.e. ‘because God keeps adjusting their orbits’). If science later provides a non-teleological explanation for the phenomena in question (in this case it did), this ‘god-of-the-gaps’ is thereby apt to appear an unnecessary hypothesis (such a change in explanation does not of course *contradict* belief in God). This is in turn often taken to imply that God is thereby rendered an unnecessary hypothesis to be dispensed with by Occam’s razor. However, this does not follow, except in the case of theism lacking any warrant for belief in God besides the ‘gap’ argument in question. Any warranted theistic believer will therefore legitimately interpret the collapse of a ‘gap’ argument as simply providing a more accurate picture of the nature of God’s relationship with the aspect of reality in question, not as disproving the hypothesis that God has *some sort of relationship* with the aspect of reality in question.

Moreover, a ‘god-of-the-gaps’ explanation, *when it is not an argument from ignorance*, is not necessarily unsound.⁴⁸ The ‘gap’ in question might be a *lacuna naturae causa* (a gap on account of nature) rather than a *lacuna ignorantiae* (a gap on account of ignorance); that is, a genuine gap in the proximate self-explanatory abilities of the natural world, a gap that can therefore never be ‘filled-in’ with an adequate non-teleological explanation.⁴⁹ No one would think it reasonable to accuse an engineer of committing a ‘designer of the gaps’ fallacy when they posit an aircraft designer to explain the existence of an aircraft, because there appears to be a *lacuna naturae causa* between the creative capacities of nature as understood by contemporary science and the aircraft as understood by contemporary science. Indeed, this gap is arguably larger today than it was in the days before Pasteur, when scientists believed in the spontaneous generation of life from dirt. The design inference in this instance (as in any other) is not an invincible deductive proof; but a sound, if falsifiable, inference to the best explanation. Hence ‘gaps’ are legitimate grist to the mill of both intelligent design theory and natural theology, if and when they have at least a *prima facie* claim to being *lacuna naturae causa* rather than *lacuna ignorantiae*. As J.P. Moreland concludes:

‘Thus, for example, if one discovered that living systems are discontinuous with nonliving systems in such a way that living systems bear certain features that usually result from personal agency (e.g., information in DNA, different kinds of design such as beauty, order, etc.), and if one has grounds for thinking that it is improbable that a naturalist mechanism will be found to account for this, then one could legitimately see the origin of life as a gap in the history of the universe due to a primary causal act of God.’⁵⁰

Those ‘grounds for thinking that it is improbable that a naturalist mechanism will be found’ to account for the ‘gap’ in question may well be falsifiable, but they are nevertheless *grounds*, rather than a lack of grounds that can be dismissed as mere ‘ignorance’. As philosopher of science Phil Dowe writes:

‘One of the marks of scientific knowledge is that it is defeasible, that is, open to revision. No scientific theory can be regarded as the final word, no matter how well confirmed and established it is today. There may yet be a different, even more accurate and successful theory to take its place at some time in the future. This is all the more true for the more speculative and tentative results of many arguments to the best explanation... According to [the ‘god-of-the-gaps’ objection] it is a mistake to believe in God on the grounds that doing so will explain some particular fact about nature, because such reasoning is open to refutation the moment subsequent scientific development uncovers perfectly good natural explanations for the facts in question... However, this objection is faulty... We must draw conclusions based on the evidence we have. All scientific reasoning works like that - it is by nature defeasible. That it is defeasible is no reason to ignore the conclusions as we now see them. The same may sometimes be true of reasons for God. If the reason is removed at a later time, then unless that was our only evidence for God, that is no reason to think God does not exist, and should, logically, be no reason to doubt.’⁵¹

Unfortunately the ‘god-of-the-gaps’ label is often used as a derogatory designator attached to arguments that, in reality, do not deserve the name. The current lack of a non-teleological explanation can represent an empirically defeasible failure to rebut a perfectly respectable argument by analogy, or an argument applying the principle of credulity to a set of data, or an inference to the best explanation.

When Sagan observes that ‘All organisms on Earth use a kind of molecule called a nucleic acid to encode the hereditary information and to reproduce it in the next generation’ (p. 67), he puts his finger upon the central question of origins – *the origin of information*: ‘All organisms on Earth use the identical *code* book for *translating* nucleic acid *language* into protein *language*.’ (p. 67, my italics) Of course, we know of one causally adequate explanation for coded information that can be translated from one language into another – intelligence. The inference from the informational properties of life to the hypothesis of intelligent design is an inference based upon our everyday knowledge of causality – information (such as the information exhibited by this paper, or by the computer programme used by the word processing package I’m using to write it) comes from minds, not from random processes, or from natural laws, or from natural laws working upon random processes. That is no more an illegitimate ‘gap’ argument than is the argument of a forensic scientist who concludes that someone was the victim of murder rather than an accident or other ‘natural causes’. Indeed, the only ‘gap’ in this scenario is the one admitted by Sagan himself, the gap between our actual knowledge of reality and any plausible sufficient explanation of the origin of life in purely natural terms. Of *this* gap, Sagan admits: ‘We cannot surely say it is fully filled in yet.’ (p. 64) Crucially, *this* gap is *not the basis for the design inference, but a naturalistic failure to rebut the design inference*.

Nor has *this* gap been closed in the intervening years. Writing in the 50th Anniversary

special edition of *New Scientist* in 2006, Paul Davies confirmed that: ‘One of the great outstanding mysteries is the origin of life’ and affirmed that: ‘The truth is, nobody has a clue.’⁵² In February 2007 *Wired* magazine ran an article entitled ‘What We Don’t Know About’ which included a section on ‘Where did life come from?’ by Gregg Easterbrook, who wrote:

‘What creates life out of the inanimate compounds that make up living things? No one knows. How were the first organisms assembled? Nature hasn’t given us the slightest hint. If anything, the mystery has deepened over time. After all, if life began unaided under primordial conditions in a natural system containing zero knowledge, then it should be possible - it should be *easy* - to create life in a laboratory today. But determined attempts have failed... no one has come close... Did God or some other higher being create life? ...Until such time as a wholly natural origin of life is found, these questions have power. We’re improbable, we’re here, and we have no idea why. Or how.’⁵³

In a March 2007 interview, cell biologist and atheist Lewis Wolpert candidly commented:

‘How the cell came about is just... Wow! It’s absolutely mind-blowing. It’s truly miraculous – almost in a religious sense. I think we understand quite a lot about evolution – although even in later evolution there are problems for which we don’t have good explanations – but the origin of life itself, the origin of the cell itself, that’s not solved at all.’⁵⁴

Indeed, far from closing the gap between nature and naturalism, research has consistently *widened* it. As biochemist Michael J. Behe writes:

‘it’s been the very progress of science itself that has made intelligent design plausible. Fifty years ago much less was known about the cell, and it was much easier then to think that Darwinian evolution was true. But with the discovery of more and more complexity at the foundation of life, the idea of intelligent design has gained strength. That trend is continuing. As science pushes on, the complexity of the cell is not getting less; on the contrary, it is getting much greater.’⁵⁵

Allow me to make it perfectly clear that *if* an explanation for the origin of life framed purely in terms of secondary causes could be sustained, then I would have no problem with that. However, Sagan cannot afford to be similarly relaxed about things (for naturalism, some sort of naturalistic explanation is a necessity), and his attempt to narrow the gap between the scientific data and his philosophical dogma contains an amusing leap of logic.

Sagan notes that ‘there is a range of evidence for microfossils dating back... to as much as 3,500 million years ago’ (p. 98), and that the Earth formed ‘about 4,600 million years ago’ but was ‘not suitable for the origin of life back then...’ (p. 98) Indeed:

‘the Earth was not in a suitable state for the origin of life until perhaps 4,000 million years ago. So... there was only about 500 million years for the origin

of life. But those early fossils are by no means extremely simple organisms. They are, in fact, colonial algal stromatolites, and a great deal of evolution had to precede them. And that therefore says that the origin of life happened in significantly less than 500 million years.' (p. 99)

Updating Sagan's figures, we can note with Peter D. Ward and Donald Brownlee that:

'scientists are confident that life had already arisen 3.8 to 3.9 billion years ago... simultaneously with the cessation of the heavy bombardment. As soon as the rain of asteroids ceased and surface temperatures on Earth permanently fell below the boiling point of water, life seems to have appeared.'⁵⁶

Of course, such figures, when combined with calculations concerning the likelihood of the chance assembly of an organism complex enough to undergo any evolutionary changes (not to mention calculations about the rate and plausible scope of evolutionary change once evolution is underway), constitute *prima facie* evidence against the theory that life arose by purely naturalistic processes. However, Sagan is content to beg the entire question by noting that the origin and evolution of life:

'must have happened very fast. A process that happens quickly is a process that in some sense is likely. The faster it happens, the more likely it is. There is difficulty in extrapolating from a single case; nevertheless this evidence suggests that the origin of life was in some sense easy, in some sense sitting in the laws of physics and chemistry. And if that's true, that is a very important fact for the consideration of extraterrestrial life.' (p. 99)

There is simply no 'evidence' given here to show that the origin of life happened as a result of a physical 'process', likely or otherwise. Rather, there is a philosophical *assumption* that the origin of life must have happened as the result of a physical process, combined with a philosophical *deduction* that since life appeared and became even more complex over a (geologically speaking) very short period of time, the assumed physical process in question must have been a 'likely' and 'easy' one.

Sagan does reference carefully controlled experiments that create amino acids. However, not only are there well documented problems with such experiments, but the creation of amino acids falls a long way short of the creation of DNA or RNA. As Walter L. Bradley observes: 'the origin of a sophisticated system that is both rich in information and capable of reproducing itself has absolutely stymied origin-of-life scientists'.⁵⁷

The concept of abiogenesis was originally held by ancient Greek thinkers such as Anaximander and Aristotle, and was revived in the mid-twentieth century when Stanley Miller and Harold Urey recreated in the laboratory what they believed to be an accurate representation of the early earth's atmosphere, and managed (whilst mostly producing oils and tars) to produce some amino acids by passing an electric spark through their mixture of gases. However: 'The "prebiotic soup hypothesis," popularized by Miller's experiment, came under withering criticism from chemists for ignoring the role of competing and destructive cross-reactions... that would be expected in any hypothetical ocean or pond.'⁵⁸ Moreover: 'Miller and Urey's experiment only works as long as oxygen is absent and certain critical ratios of

hydrogen and carbon dioxide are maintained.’⁵⁹ As Dean L. Overman explains: ‘The presence of even a small amount of oxygen, assiduously avoided in the laboratories of these experiments, would prevent the formation of amino acids and nucleotides...’⁶⁰ Of course, if oxygen were not present, the molecules of life would have been unprotected from deadly ultraviolet radiation: ‘What we have then is a sort of “Catch 22” situation. If we have oxygen we have no organic compounds, but if we don’t have oxygen we have none either.’⁶¹

Scientists now think that oxygen *was* present in the early earth’s atmosphere, and that ‘the atmosphere of the early earth was mostly made up of carbon dioxide and ammonia [meaning that the Miller-Urey] experiment was not relevant to origin of life scenarios.’⁶² As Hurbert P. Yockey comments:

‘The “Warm little pond” scenario was invented *ad hoc* as a materialistic reductionist explanation of the origin of life. It is unsupported by any other evidence and it will remain *ad hoc* until such evidence is found.’⁶³

Stephen C. Meyer calculates that: ‘the probability of constructing a rather short functional protein at random [is] so small as to be effectively zero...’⁶⁴ In other words, not only does naturalistic science lack an explanation of *how* the chemistry of life arose, or evidence to show *that* life ‘just happened’, it also flies in the face of evidence that life *didn’t* ‘just’ happen! As Keith Ward argues:

‘It seems hugely improbable that... amino acids should meet and combine to form large molecular structures capable of self-replication... The motive for positing some sort of intelligent design is almost overwhelming.’⁶⁵

Life Transcending Physics and Chemistry

Sagan’s suggestion that ‘the origin of life was in some sense easy, in some sense sitting in the laws of physics and chemistry’ (p. 99) is contradicted by our knowledge of the role played by information in life. Dean Kenyon, Professor Emeritus of Biology at San Francisco State University, and co-author of the book *Biochemical Predestination* (McGraw-Hill, 1969) which advocated the ‘written into the laws of chemistry’ view of life, abandoned the theory as unworkable in the 1980’s.⁶⁶ As biologist Neil Broom explains:

‘The sequence making up a particular DNA strand is not dependent on any preferred bonding between the individual bases. Each base is the molecular equivalent of the dot or dash in the Morse Code and can be arranged in any linear combination without breaking the rules of chemical bonding.’⁶⁷

I once lived in shared accommodation with friends. The fridge in our kitchen was home to a set of magnetic letters that we used to leave each other messages. The magnetic attraction between the letters and the fridge door explained why the letters attached themselves to the fridge, but it did not explain *the order* in which the letters attached themselves to the fridge (if the laws of magnetism *had* explained the order of letters, then we could not have used the letters to leave each other messages!). For a message to grace our fridge, the magnetic laws that bound each letter to the door had

to come under the control of a ‘higher principle’, a teleological explanation: one of the housemates had sequenced the letters using the laws of magnetism in order to leave us a message. A sight-unseen, random placement of magnetic letters on the fridge might have resulted in un-specified complex sequences (gibberish), or un-complex specified sequences (short words), but not in a sequence exhibiting specified complexity (e.g. ‘we need to purchase more milk today’). Just as a meaningful sequence of letters on our fridge could not be explained by the laws of magnetism alone, so the sequence of amino acids in biological macromolecules, from enzymes to DNA, cannot be explained by the laws of physics or chemistry alone without reference to intelligence. As J.T. Trevors and D.L. Abel note:

‘if chemistry determined functional sequencing... sequences would have such a high order and high redundancy that genes could not begin to carry the extraordinary prescriptive information that they carry.’⁶⁸

By its very nature as a code, then, DNA cannot be explained in terms of physics or chemistry:

‘the physical and chemical regularities that scientists describe as laws do not (by definition) produce the information-rich configurations of matter that the origin of life requires. God may have created natural law, but he does not use natural laws to create specified biological information.’⁶⁹

As Michael Polanyi argued (even before Dean Kenyon published his now abandoned theory of biological predestination):

‘objects conveying information are irreducible to the terms of physics and chemistry... As the arrangement of a printed page is extraneous to the chemistry of the printed page, so is the base sequence in a DNA molecule extraneous to the chemical forces at work in the DNA molecule.’⁷⁰

Interestingly, Sagan’s suggestion that ‘the origin of life was in some sense easy, in some sense sitting in the laws of physics and chemistry’ (p. 99) is contradicted by Sagan himself, who writes: ‘what we have here is in some sense rare... This says that life is not guaranteed, that life requires something special, something improbable.’ (p. 195) He quickly adds: ‘I’m not for a moment suggesting it requires miraculous, divine, mystical intervention.’ (p. 195) Perish the thought! But Sagan fails to provide any reason not to think it...

Not asking for much?

Sagan cautions that in seeking a naturalistic origin theory:

‘We’re not trying to make a human being from scratch, to have all the molecules of a human being fall simultaneously together in a primitive ocean and then have someone swim out of the water. That’s not what we’re asking for. What we’re asking for is something that get’s life going, so this enormously powerful sieve of Darwinian natural selection can start pulling out the natural experiments that work... and neglecting the cases that don’t work.’

By presenting us with the ridiculously improbable request that a fully functional human spontaneously self-assemble from amino-acids of a primitive ocean (this is Sagan's parallel to Fred Hoyle's notorious comparison between the spontaneous origin of life and a tornado constructing a Boeing 747 out of a scrap heap), Sagan produces a rhetorically powerful contrast with the task he actually requires nature to perform: the spontaneous self-assembly of something living that can undergo evolutionary change (a task with which evolution is by definition unable to help). So Sagan isn't really asking for much, is he?

Recent research shows that the minimum number of protein-producing genes a single-celled organism needs to survive and reproduce in the laboratory is somewhere between 265 and 350!⁷¹ One of the simplest self-reproducing organism known outside the laboratory is the bacterium *Mycoplasma Genitalium*, which has 482 genes. Dr Chris Hutchison and his team experimented on *Mycoplasma Genitalium* by randomly inserting bits of unrelated DNA into the middle of genes to disrupt their function and seeing if the organism thrived anyway. They found that only around a third of the *Mycoplasma*'s genes were unnecessary to its survival in the laboratory, whereas the other two thirds were necessary to its survival. Outside of the laboratory *Mycoplasma Genitalium* is 'unable to sustain itself without parasitizing on an even more complex organism... Therefore a hypothetical first cell that could sustain itself would have to be even *more* complex.'⁷² Fazale Rana & Hugh Ross argue that:

'the minimum complexity for independent life must reside somewhere between about 500 and 1,500 gene products. So far, as scientists have continued their sequencing efforts, all microbial genomes that fall below 1,500 belong to parasites. Organisms capable of permanent independent existence require more gene products. A minimum genome size (for independent life) of 1,500 to 1,900 gene products comports with what geochemical and fossil evidence reveals about the complexity of Earth's first life. Earliest life forms displayed metabolic complexity that included photosynthetic and chemoautotrophic processes, protein synthesis, the capacity to produce amino acids, nucleotides, fatty acids and sugars [as well as] the machinery to reproduce. Some 1,500 different gene products would seem the bare minimum to sustain this level of metabolic activity.'⁷³

Hence, in point of fact, Sagan *is* asking for rather a lot! Indeed, protestations to the contrary, he is asking for something analogous to Hoyle's Boeing 747. Sagan responds to Hoyle's analogy:

'That's a vivid image. It's also a very useful image, because, of course, the Boeing 747 did not spring full-blown into the world of aviation; it is the end product of a long evolutionary sequence, which... goes back to... the Wright biplane. Now, the Wright biplane does look as if it were spontaneously assembled by a whirlwind in a junkyard. And while I don't mean to criticize the brilliant achievement of the Wright brothers, as long as you remember that there is an evolutionary history, it's a lot easier to understand the origin of the first example.'

As long as you ignore:

- a) the fact that the Boeing 747 is the end product of a sequence of *intelligently designed* evolution

And:

- b) the fact that that the Wright brother's biplane was not, and does not look like it was 'spontaneously assembled by a whirlwind in a junkyard' (it would hardly be the 'brilliant achievement' Sagan acknowledges it to be if it were, or if it did)

And as long as you are unprepared to question the dogma that:

- c) anything complex with an evolutionary history (designed or otherwise) *must* be traced back to something simple enough to be explained by 'a whirlwind in a junkyard' or its equivalent

Then you will not have found what Sagan has just said (which completely ignores the actual evidence concerning the complexity of life) laughable!

Extraterrestrial Intelligence?

Whether or not you think aliens exist depends primarily upon what assumptions about the origin of life you bring to the question. The relevant assumptions were organized into an equation by pioneer SETI researcher Frank Drake.⁷⁴ The Drake Equation⁷⁵, as it has become known, suggests that the number of detectable civilizations (N) is determined by: multiplying the rate of formation of stars suitable for life (R^*) by the fraction of those with planets (fp), by the number of those planets that are suitable for life (ne), by the fraction of these planets where life actually evolves (fl), by the fraction of these on which intelligent life evolves (fi), by the fraction of these that develop civilizations that produce detectable signs of their existence (fc), by the length of time such civilizations will produce detectable signs of their existence (L). That is:

$$N = R^* \times fp \times ne \times fl \times fi \times fc \times L$$

Sagan notes that he can only offer: 'my wild guesses about what those numbers are... we don't know these numbers very well... our uncertainty progressively increases as we go from the leftmost to the rightmost factor.' (p. 110) His guesses are laced with terms like 'probably' and 'maybe' (p. 111)

Sagan makes conservative and non-conservative calculations, and derives a number for N of between 1 (us) and 10^6 . The value of N (and, of course, the value for fi crucial to Sagan's problem of evil argument) derived from this equation depends more upon the philosophical assumptions underlying the values assigned to its component parts (especially fl and fi) than it does to hard scientific evidence. We have already observed how Sagan's argument for fl is question-begging because it simply assumes that evolution by natural selection is true. While a Christian *can* accept evolution by natural selection as God's way of populating creation, there can be no '*has to be*' about it for anyone who believes in God, and there are a range of other options that Christians should seriously consider. As Alvin Plantinga writes:

‘a Christian (naturally) believes that there is such a person as God, and believes that God has created and sustains the world. Starting from this position... we recognize that there are many ways in which God could have created the living things he has in fact created: how, in fact, did he do it?... Did it all happen just by way of the working of the laws of physics, or was there further divine activity..? That’s the question... Starting from the belief in God, we must look at the evidence and consider the probabilities as best we can.’⁷⁶

Moreover, as Jimmy H. Davis and Harry L. Poe write: ‘recently scientists have been rethinking the assumptions behind the Drake Equation.’⁷⁷ As noted in Part I, there are around 200 parameters required for a life-bearing planet. Comparing the chances of a planet falling within all of these parameters by chance with our best estimate of the total number of planets in the universe astronomer Hugh Ross estimates that there is ‘less than 1 chance in 10^{215} ’ of even one habitable planet existing in the universe.⁷⁸ By natural processes alone, *we* shouldn’t even be here – let alone alien life forms on another planet.

Detecting Intelligence

Sagan readily acknowledges that intelligence can be scientifically detected, by discovering unlikely and independently specified patterns (‘specified complexity’) in nature.⁷⁹ In discussing the search for extra-terrestrials via radio signals, Sagan argues:

‘Now suppose we get a message. What would it be like? Here is a possibility... it might be a sequence of pulses that could not possibly be of natural origin. For example, a sequence of prime numbers... There is no natural process that could produce such numbers.’ (p. 120)

Note that inferring intelligence as the cause of such a sequence of prime numbers does not constitute an ‘alien of the gaps’ argument (Sagan would not rule intelligence out of court as an explanation for this sequence, nor demand that scientists continue searching for a naturalistic explanation). Such a sequence of pulses exhibiting specified complexity could be picked out by a computer from the background noise: ‘leaving no doubt that this was an artificial signal of extra-terrestrial origin...’ (p. 118)

But of course, if the numbers for various factors in the Drake equation are so low as to be staked against the independently specifiable pattern of intelligent life existing, then such specified complexity is precisely the same sort of evidence for intelligence – and evidence plausibly interpreted in theistic terms - looked for by the SETI programme. Sagan admits that the arguments for alien and divine intelligence can be treated at least analogously:

‘At what moment do you say that the evidence is sufficient to deduce the presence of extraterrestrial intelligence? I believe that while the details are slightly different, the argument is not significantly different from the question, what would be convincing evidence of the existence of an angel or a demigod or a god?’ (p. 108.)

Moreover, if our existence on its own is enough to trigger a design inference, then the discovery that aliens exist, far from undermining the rationality of theism (as Sagan suggests), if it were made despite the odds against it, would actually *increase* the evidence for design.

Recommended Resources

Carl Sagan Portal @ www.carlsagan.com/

Wikipedia: Carl Sagan @ http://en.wikipedia.org/wiki/Carl_Sagan

Jack Collins, 'Miracles, Intelligent Design, and God-of-the-Gaps', *Perspectives on Science and Christian Faith*, Volume 55, Number 1, March 2003 @ www.asa3.org/ASA/PSCF/2003/PSCF3-03Collins.pdf

William A. Dembski, 'In Defence of Intelligent Design' in Philip Clayton (ed.), *Oxford Handbook of Religion and Science* (Oxford University Press, 2006) @ www.designinference.com/documents/2005.06.Defense_of_ID.pdf

J.T. Trevors & D.L. Abel, 'Three subsets of sequence complexity and their relevance to biopolymeric information', *Theoretical Biology and Medical Modelling*, (2005, 2: 29) @ www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1208958

Ø.A. Voie, 'Biological function and the genetic code are interdependent' *Chaos, Solutions and Fractals*, 2006, Vol 28(4), p. 1000-1004 @ <http://home.online.no/~albvoie/index.cfm>

Peter S. Williams, 'If SETI is Science and UFOlogy Is Not, Which Is Intelligent Design Theory?' @ www.arn.org/docs/williams/pw_setivsufology.htm

Video:

Carl Sagan Videos @ <http://technorati.com/videos/tag/Carl%20Sagan> & www.youtube.com/results?search=related&search_query=Carl%20Sagan%20Cosmos&v=pMHNnhAEDN4

The Privileged Planet (Illustra Media); available on-line @ www.theapologiaproject.org/media/the_privileged_planet.ram

Unlocking the Mystery of Life (Illustra Media); available on-line @ www.theapologiaproject.org/media/unlocking_the_mystery_of_life.ram

Douglas Geivett, 'Problems of Evil' @ <http://hisdefense.org/LinkClick.aspx?link=http%3a%2f%2fhisdefense.org%2fvideo%2fGeivett+-+Problems+of+Evil.WMV&tabid=136&mid=954>

Dean Kenyon, *The Origin of Life* @ http://webcast.ucsd.edu:8080/ramgen/UCSD_TV/6470oriLif.rm

Audio:

William Lane Craig, 'The Problem of Evil' @ www.veritas.org/mediafiles/A97TAMU03.mp3

Unbelievable, 'UFO's, Aliens and God' @ <http://mwtraffic.ld.mediawave.co.uk/playout/playlist.aspx?id=de8a665d04984c55bf7afd54d5aa24f2&type=1>

Books:

Michael Behe, *The Edge of Evolution: The Search for the Limits of Darwinism*, (Free Press, 2007)

Dominic J. Balestra, 'Science and Religion' in Brian Davies OP (ed.), *Philosophy of Religion: A Guide to the Subject*, (Continuum, 2003)

Guillermo Gonzalez & Jay Richards, *The Privileged Planet: How Our Place in the Cosmos Is Designed for Discovery*, (Regnery, 2004)

Stephen C. Meyer, 'DNA and the Origin of Life: Information, Specification and Explanation', in John Angus Campbell & Stephen C. Meyer (ed.'s), *Darwinism, Design, & Public Education*, (Michigan State University Press, 2003)

Peter D. Ward & Donald Brownlee, *Rare Earth: Why Complex Life Is Uncommon in the Universe*, (Copernicus, 2000)

Fazale Rana & High Ross, *Origins of Life*, (NavPress, 2004)

Part III

Having presented some (very poor) arguments against theism in the course of examining the significance of life on Earth given modern knowledge of cosmology (covered in Part I of this review) and some philosophically driven speculations about the origin of life and the existence of extra-terrestrial intelligence (covered in Part II of this review), Sagan turns to an explicit examination of the arguments of natural theology.

The Ontological Argument

Alvin Plantinga, a contemporary defender of Anselm's line of thought, defines God as a 'maximally great being' and argues that a maximally great being *must exist if its existence is possible* because 'necessary existence is a great making property.'⁸⁰ A great making property is one that is objectively good and admits of a logical maximum. The goodness of existing *per se* is a great making property that admits a logical maximum in necessary existence. And although - as Hume and Kant pointed out - saying that something 'exists' does not add to the list of its properties, to say that something 'exists necessarily' *does* add to its list of properties. Given the additional premise that 'the existence of a maximally great being is *possible*'⁸¹, it follows that a maximally great being therefore 'exists, and exists necessarily.'⁸² The ontological argument can be expressed as a logically valid syllogism:

1. By definition, if it is possible that God exists, then God exists
2. It is possible that God exists
3. Therefore, God exists

Faced with the ontological argument, the atheist does have a 'get out' clause; *but embracing this get out clause is not without its price*. The ontological argument shows that: 'the person who wishes to deny that God exists must claim that God's existence is impossible.'⁸³ That is, denying the existence of God is not on a *par* with denying the existence of the Loch Ness monster. To deny the existence of the Loch Ness monster one needn't make the claim that its existence is logically impossible, because one can coherently claim that Nessie simply fails to exist despite being logically possible. However, to deny the existence of God one does have to make the claim that God's existence is logically impossible, because one cannot coherently claim that God fails to exist despite being logically possible. This seems to be a price that many non-

theists are willing to pay, despite the fact that no independent argument has ever shown the concept of God to be incoherent. Nevertheless, Plantinga argued that his version of the ontological argument at least showed that belief in God was *no less rational than disbelief*:

‘it must be conceded that not everyone who understands and reflects on its central premise – that the existence of a maximally great being is *possible* – will accept it. Still, it is evident, I think, that there is nothing contrary to *reason* or *irrational* in accepting this premise. What I claim for this argument, therefore, is that it establishes, not the *truth* of theism, but its rational acceptability.’⁸⁴

He has subsequently contended that the modal ontological argument: ‘provides as good grounds for the existence of God as does any serious philosophical argument for any important philosophical conclusion.’⁸⁵

A Question of Design

I will have little to say here about the design argument, since that is a subject covered in some detail in Parts I and II of this review. However, it is worth mentioning that, in the course of discussing the pantheistic deity of Spinoza and Einstein, Sagan makes the following observation:

‘That the same laws of physics apply everywhere is quite remarkable... It represents an unexpected regularity to the universe. It need not have been. It could have been that every province of the cosmos had its own laws of nature. It’s not apparent from the start that the same laws have to apply everywhere.’ (p. 150)

The natural question, which Sagan does not ask, is of course: ‘So why are the laws the way they are?’ Since he does not ask the question, it is unsurprising that Sagan supplies no answer. I would simply note that God’s existence would explain this ‘remarkable’ fact, a fact that is basic to science and therefore in principle inexplicable by science.

Cosmological Argument

In ‘an ecumenical spirit’ Sagan begins by examining one of seven arguments for God by the eleventh century Hindu logician Udayana, arguments that Sagan pronounces are ‘in many ways are as sophisticated and certainly more ancient than the Western arguments.’ (p. 153) According to Sagan, Udayana begins by reasoning that:

‘all things must have a cause. The world is full of things. Something must have made those things.’ (p. 153)

This is the notoriously unsound version of the cosmological argument frequently but mistakenly attributed to Western proponents of natural theology by non-theists. Sagan says that: ‘this is very similar to a Western argument that we’ll come to shortly.’ (p. 153) It is similar, in that it is a causal argument for God’s existence; but it is not similar in that the Western argument does not depend upon the (false) premise that

‘all things must have a cause.’ Sagan explains that the Western cosmological argument runs as follows:

‘There are things all around us... caused by something else... Well, it can’t go on forever, an infinite regress of causes... and therefore you need to come to an uncaused first cause.’ (p. 155)

This argument is a distinct improvement upon Udayana’s proof, for few would deny the first premise: that there are at least some things around us that were caused by other things. Combined with the premise that infinite causal regresses are impossible, it certainly follows with logical validity that there must be an uncaused cause, something that halts the regress of causality by being a cause that falls outside the class of caused things. Sagan unfortunately proceeds to level a criticism against the Western argument that only applies to the Eastern argument: ‘if we say that God made the universe, it is reasonable to then ask, “And who made God?”’ (p. 155) But of course, it is *not* reasonable to ask ‘And who made God’ as a response to an argument validly deducing the existence of ‘God’ as ‘an un-caused cause’ from the premises that *some sorts of thing* are caused and that *not everything can be caused* (i.e. an infinite regress of causes is impossible). You see the Western argument relies upon the premise that *not everything can be caused*, whereas the Eastern argument replies upon the premise that everything is caused. The Eastern premise entails an infinite regress of causes, a regress flagged up by the question ‘And who made God?’, but the Western argument depends upon the negation of this Eastern premise. Hence, if the ‘And who made God?’ question is a good counter to the Eastern argument, it cannot be a good counter to the Western argument. Indeed, the function of the ‘Who made God?’ question is to indirectly endorse the Western premise that *not everything can be caused*. Yet in conjunction with this premise, the premise that something has been caused logically entails the conclusion that there *is* an uncaused cause. Hence Sagan’s ‘Who made God?’ response to the Western cosmological argument, far from undermining it, actually supports it!

Sagan writes:

‘There are two conflicting hypotheses here, two alternative hypotheses. One is that the universe was always here, and the other is that God was always here. Why is it immediately obvious that one of these is more likely than the other? ...How does saying that God made the universe, and never mind asking where God came from, how is that more satisfying than to say that the universe was always here?’ (p. 155)

First of all, the natural theologian is not avoiding the question of where God came from. Rather, they are arguing that God is not the sort of being that has to ‘come from’ anywhere. The cosmological argument given above just is an argument for the existence of a being that didn’t ‘come from’ anywhere, for an ‘uncaused cause’. Sagan is really questioning the premise that there are ‘things all around us’ that were or are ‘caused by something else’ But to question the contingency of things around us in the natural world is to claim that things around us in the natural world are necessary (things are either necessary or contingent – the two categories are exhaustive and mutually exclusive). However, Sagan clearly does not believe this, for he has already affirmed that the laws of physics are contingent: ‘That the same laws of physics apply

everywhere is quite remarkable... *It need not have been. It could have been that every province of the cosmos had its own laws of nature. It's not apparent from the start that the same laws have to apply everywhere.*' (p. 150, my italics) Sagan only drops this (entirely plausible) metaphysical commitment when he critiques the cosmological argument in which it features as a premise.

Then again, (whilst noting that there is a distinction between cosmological arguments based on temporal and non-temporal causal regresses) one might simply point out that the universe was *not* 'always here'. Sagan writes:

'In modern astrophysics there are two contending views. First of all, there is no doubt in my mind, and I think almost all astrophysicists agree, that the evidence from the expansion of the universe, the mutual recession of the galaxies and from what is called the three-degree black-body background radiation, suggests that something like 13 or 15 billion years ago all the matter in the universe was compressed into an extremely small volume, and that something that can surely be called an explosion happened... and that the subsequent expansion of the universe and the condensation of matter led to galaxies... and all the rest of the details of the universe we see around us. Now, what happened before that? There are two views. One is "Don't ask that question," which is very close to saying that God did it. And the other is that we live in an oscillating universe in which there is an infinite number of expansions and contractions.'

Sagan writes that: 'The former of these views happens, by chance, to be close to the Judeo-Christian-Islamic view, the latter close to the standard Hindu views.' (p. 156) The 'by chance' in this sentence is of course a gratuitous assumption on Sagan's part.

Quite aside from mathematical/philosophical arguments against actual infinities that can be mounted, this is another instance where Sagan's argument is undermined by scientific progress, for Ann Dryden helpfully adds a footnote that comments: 'IN 1998 two international teams of astronomers independently reported unexpected evidence that the expansion of the universe is accelerating. These findings suggest that the universe is not oscillating...' (p. 156) Which leaves, of course, only Sagan's former hypothesis.

Sagan observed that the 'oscillating universe' response is open to scientific falsification:

'this is very different from the usual theological approach, where there is never an experiment that can be performed to test out any contentious issue. Here there is one. So we don't have to make judgements now.' (p. 156)

However, after the experiment has been performed, we can no longer take refuge in such agnosticism.

Religious Experience

Sagan acknowledges:

‘People have religious experiences. No question about it. They have them worldwide, and there are some interesting similarities in the religious experiences that are had worldwide. They are powerful, emotionally extremely convincing, and they often lead to people reforming their lives and doing good works, although the opposite also happens.’ (p. 162.)

The question is, of course: ‘What is the best explanation of this phenomenon?’ Consider, first of all, in sketch form, some arguments for theism from religious experience.

Richard Swinburne defends the need of placing the burden of proof upon those skeptical of perceptual claims, including religious perceptual claims:

‘It is a basic principle of knowledge... that we ought to believe that things are as they seem to be, until we have evidence that we are mistaken... If you say the contrary – never trust appearances until it is proved that they were reliable – you will never have any beliefs at all. For what would show that appearances were reliable, except more appearances?’⁸⁶

This principle encourages us to take religious experience at face value, unless there is sufficient reason to doubt it: ‘If it seems... to *S* that *x* is present, that is good reason for *S* to believe that it is so, in the absence of special considerations – whatever *x* may be.’⁸⁷ Swinburne argues that if you lack religious experience yourself, the principle of credulity means that it is reasonable to trust the reports of those with such experience:

‘Since (probably) others have the experiences which they report, and since (probably) things are as a subject’s experience suggests that they are, then (with some degree of probability) things are as others report... One who has not himself had an experience apparently of God is not in as strong a position as those who have. He will have less evidence for the existence of God; but not very much less, for he will have testimony of many who have had such experiences...’⁸⁸

Other people’s testimony regarding their religious experience carries, by the principle of credulity, *prima facie* validity. Hence Philip Van der Elst contends:

‘the fact that large numbers of people of all nations, types, and temperaments appear to have had some internal experience of God, should be regarded by an open-minded person as some evidence... for the truth of theism.’⁸⁹

Moreover, philosophers such as J.P. Moreland have argued that: ‘there are several reasons for holding that there is a close analogy between sensory perception and numinous [religious] perception. And since we know that the former is (usually) veridical, there is good reason to take the latter as (usually) veridical.’⁹⁰

Finally, as William P. Alston suggests:

‘one’s experience of the changes in one’s life that follow a conversion, or one’s experience of the gradual improvement of one’s character in the course of sincere attempts to open oneself up to the influence of the Holy Spirit, can

be of cognitive significance, in addition to other forms of significance, as presenting explananda that are naturally explained theologically.’⁹¹

So what does Sagan have to say to rebut these sorts of argument? His primary response is as follows:

‘I do not mean in any way to object to or deride religious experiences. But the question is, can any such experience provide other than anecdotal evidence of the existence of God or gods? One million UFO cases since 1947. And yet, as far as we can tell, they do not correspond – any of them – to visitations to the Earth by spacecraft from elsewhere. Large numbers of people can have experiences that can be profound and moving and still not correspond to anything like an exact sense of external reality.’

But against this – what is so terrible about ‘anecdotal evidence’? Anecdotal evidence is better than no evidence at all!

The crux of Sagan’s response to the argument from religious experience is to point out that people can be mistaken about their perceptual claims. Of course they can. But just because people *can* be mistaken is insufficient reason to justify the conclusion that they *are* mistaken. Sagan’s attempted rebuttal of the argument from religious experience doesn’t even rise to the level of an argument, because it lacks a second premise to justify the inference that *all religious experience is delusional* from the premise that *experience can be delusional*.

Sagan’s UFO analogy seems to play two roles in his argument, both of which are questionable. The first role is to support his only premise, namely, that experience can be delusional. But of course, experience of UFO’s concerns directly empirical experience whereas experience of God is only indirectly related to empirical experience, if at all (it depends which type of religious experience one is considering); and one might argue that religious experience is closer to perceptual practices, such as introspection, that are actually more reliable than empirical perceptual practices. The second role of the analogy is to point out that even if many people have a similar experience, that experience can be delusional. Of course it can, but there is hardly a viable statistical comparison between one million UFO experiences and millions upon millions of religious experiences. Of course a billion people *can* be wrong, but it is still *less likely* than a million people being wrong. Hence Sagan’s analogy does little to justify the conclusion that the millions upon millions of people who claim to have experienced God are more likely than not to be deluded *en mass*.

Sagan secondarily notes that:

‘religious experiences can be brought on by specific molecules. There are many cultures than consciously imbibe or ingest those molecules in order to bring on a religious experience. The peyote cult of some Native Americans is exactly that, as is the use of wine as a sacrament in many Western religions... This suggests that there is some molecular basis for the religious experience and that it need not correspond to some external reality.’ (p. 163)

Of course, for this to even count as an attempted rebuttal of the argument from religious experience, Sagan must mean that the existence of a molecular basis for religious experience must imply that there *is no* correspondence to any external reality, not merely that there ‘need not be’ such a correspondence.

Having tightened up Sagan’s argument for him, what can we say in response? First of all, Sagan’s analogy between religious practices such as the peyote cult on the one hand and sipping tiny quantities of communion wine in church on the other hand is patently tissue thin. One cannot seriously imagine that Christian religious experience is all brought about by alcohol – if it was then more alcoholics would no doubt be Christians! More importantly, Sagan’s attempted rebuttal is actually self-contradictory: If the mere existence of a molecular basis for an experience is sufficient to imply that the experience in question is unreliable, then it would follow that all human experience is unreliable – including the experience that leads us to think that molecules, brains, and religious experiences exist! Are we to conclude that roses do not exist simply because the correct brain-manipulation could (in theory at least) cause someone to mistakenly believe that they smelt or even saw one? In other words, Sagan needs a premise that restricts the implication of delusion to religious experiences in the presence of a molecular trigger, but not only does he fail to provide such a premise (making his argument a *non sequiter*), but it seems hard to imagine any such premise that wouldn’t strike us as being *ad hoc*.

The Problem of Evil Again

Sagan raises the problem of evil once again; but once again he correctly observes that it is not an argument against theism per se, but rather an argument against a specific form of theism in which God is considered to be the perfect being:

‘Grant for a moment that evil exists... And grant also that there is a God that is benevolent towards human beings, omniscient, and omnipotent... Well, it was understood by the pre-Socratic philosophers that all four of these propositions cannot simultaneously be true.’ (p. 163)

Unfortunately for Sagan, it is understood by the majority of contemporary philosophers that all four propositions can be true; that is, that there simply is no logical contradiction between the existence of evil and the existence of God so defined. As Craig argues:

‘there is no reason to think that God and evil are logically incompatible. After all, there is no *explicit* contradiction between them. And if the atheist means that there is some *implicit* contradiction between God and evil, then he must be presupposing some hidden premise to bring out this implicit contradiction. But... no philosopher has been able to identify such premises... But more than that, we can actually prove that God and evil *are* logically compatible. You see, the atheist presupposes that God cannot have morally sufficient reasons for permitting the evil in the world. But this assumption is not necessarily true. So long as it is even *possible* that God has morally sufficient reasons for permitting evil, it follows that God and evil are logically consistent.’⁹²

It is now widely accepted that: ‘philosophers of religion have cast serious doubt on whether there even is any inconsistency involving the appropriate propositions regarding evil and God’s alleged properties.’⁹³ Alvin Plantinga reports that: ‘most [non-theists] have conceded that in fact there isn’t any inconsistency between the existence of an omnipotent, omniscience and wholly good God and the existence of the evil the world contains.’⁹⁴ For example, agnostic Paul Draper concedes:

‘it is possible that there is some good reason (perhaps a reason too complicated for humans to understand) for God to permit tragedies. So tragedies don’t conclusively disprove God’s existence.’⁹⁵

Failure to specify propositions making the essential theological doctrines of theists incompatible with the existence of evil led atheist J.L. Mackie to admit: ‘the problem of evil does not, after all, show that the central doctrines of theism are logically inconsistent with one another.’⁹⁶ Fellow atheist William L. Rowe observes that few modern philosophers think there is any logical contradiction between the existence of God and the existence of evil:

‘Some philosophers have contended that the existence of evil is *logically inconsistent* with the existence of the theistic God. No one, I think, has succeeded in establishing such an extravagant claim. Indeed, granted incompatibilism, there is a fairly compelling argument for the view that the existence of evil is logically consistent with the existence of the theistic God.’⁹⁷

The ‘Not Enough Evidence’ Argument

Sagan concludes that:

‘the alleged natural theological arguments for the existence of God, the sort we’re talking about, simply are not very compelling... And yet it is perfectly possible to imagine that God, not an omnipotent or an omniscient god, just a reasonable competent god, could have made absolutely clear cut evidence of His existence.’ (p. 165)

The implied conclusion, of course, is that no reasonably competent god exists. Of course, I dissent from Sagan’s conclusion that the argument of natural theology are not compelling – but else can be said in response to his argument?

Asked what he would say if he found himself standing before God on the judgement day and God asked him, ‘Why didn’t you believe in me?’, Bertrand Russell replied: ‘I’d say, “Not enough evidence, God! Not enough evidence!”’ There is an interesting difference in *attitude* on this point between Russell and Sagan on the one hand, and H.L. Mencken on the other hand, who answered essentially the same question by saying: ‘If I do fetch up with the twelve apostles, I shall say, “Gentlemen, I was wrong”.’⁹⁸ In this context we should not shy away from the fact that non-theists may (and note that I say *may* rather than *will*) fail to appreciate genuine evidence for theism due to non-rational factors. As Piers Benn acknowledges:

‘since some theistic religions teach that sin can impair our thinking, we risk begging the question against those religions if we assume that *if* we can see no good reason for believing them, then they are almost certainly false.’⁹⁹

Aside from calling upon concepts such as sinful wish-fulfilment (e.g. Freud’s Oedipal complex) to explain why people may be expected to fail to perceive God or to hide from what they do perceive of God, the theist can question the premise that we are in a good epistemic position to rationally warrant the expectation that God’s existence should be more obvious to us than is the case. As J.P. Moreland and William Lane Craig explain:

‘the absence of evidence is evidence of absence only in cases in which, were the postulated entity to exist, we should expect to have some evidence of its existence. Moreover, the justification conferred in such cases will be proportional to the ratio between the amount of evidence that we do have and the amount of evidence that we should expect to have if the entity existed. If the ratio is small then little justification is conferred on the belief that the entity itself does not exist... But if this is correct, then our justification for atheism depends on (1) the probability that God would leave more evidence of his existence than what we have and (2) the probability that we have comprehensively surveyed the field for evidence of his existence... Suddenly the presumer of atheism, who sought to shirk his share of the burden of proof, finds himself saddled with the very considerable burden of proving (1) and (2) to be the case.’¹⁰⁰

Ignoring such complexities, Sagan helpfully attempts to provide some examples of things a competent god could do to proclaim his existence. He could, for example, reveal truths in ancient times that the people of that time would not otherwise know, and ensure that they faithfully preserved this revelation until such time as humanity independently discovers such truth for themselves and is then in a position to ‘deduce the existence of God.’ (p. 166) One of Sagan’s examples revolves around revealing scientific truths such as: ‘A body in motion tends to remain in motion. Don’t think that bodies have to be moved to keep going. It’s just the opposite really. So later on you’ll understand that if you didn’t have friction, a moving object would just keep moving.’ (p. 166) But, of course, Sagan either overlooks or dismisses the fact that God has done something along these general lines – not concerning truths of physics, but concerning truths of history.

The prophet Isaiah laid down the following verification challenge to other religions: ‘Bring in your idols to tell us what is going to happen... declare to us the things to come, tell us what the future holds, so we may know that you are gods.’ (Isaiah 41:22) Isaiah clearly sets up a distinction between idols, who cannot and so do not reveal the future, and God, who can and does. As Robert C. Newman explains:

‘Fulfilled predictions are one type of miracle that can be tested centuries after the event took place. All we need is good evidence (1) that the text clearly envisions the sort of event alleged to be the fulfillment, (2) that the prophecy was made well in advance of the event predicted, (3) that the prediction actually came true and (4) that the event predicted could not have been staged [or infallibly known in advance] by anyone but God. The strength of the

evidence is greatly enhanced if (5) the event itself is so unusual that the apparent fulfilment cannot be plausibly explained as a good guess.¹⁰¹

If and when these criteria are met, prophecies are instances of ‘specified complexity’ (cf. Part II of this review) meriting (as Sagan acknowledges) a design inference. Mathematician Peter Stoner analysed 48 specific predictions about the Messiah in the Old Testament that were fulfilled by Jesus, and concluded that the chances of anyone fulfilling them by chance was 1 in 10^{157} ! As Robert D. Culver argues:

‘Even by using the most extreme tactics it is impossible to date a large number of the Old Testament prophecies so late that they may be considered mere historical accounts rather than predictions. And once we conclude that many of these prophecies are truly prophetic, the whole narrative of human history becomes a vast account of their fulfilment and a vast demonstration of the power and foreknowledge of God and the truth of His Word.’¹⁰²

The thought that came into to my mind whilst reading Sagan’s suggestion for how God should go about revealing himself was this: ‘What would Sagan *really* say about the evidence he recommends if it actually existed?’ My guess is that he would say the same sort of thing that he would say in the face of the evidence of fulfilled prophecy. That is, I suspect he wouldn’t actually be convinced; and I think that this would say more about his ‘skeptical’ attitude than it would about the evidence.

However, the final knock-out blow to Sagan’s argument comes in the appendix of Q&A with his audience, where, in reply to the question: ‘why you think any omnipotent being would want to leave evidence for us’, Sagan says:

‘There is no reason I should expect an omnipotent being to leave evidence of His existence... And I hope it is clear that the fact that I do not see evidence of such a God’s existence does not mean that I then derive from that fact that I know that God does not exist. That’s quite a different remark. *Absence of evidence is not evidence of absence.*’ (p. 237)

Hence Sagan himself decries the argument he seemed to be making in his lecture!

The Moral Argument

Sagan writes: ‘Then there is the moral argument for the existence of God, generally attributed to Immanuel Kant... It’s just that we are moral beings; therefore God exists. That is, how else could we know to be moral?’ (p. 159) Sagan is clearly confused about the moral argument. The argument he gives as representing this strand of argument is neither the argument defended by Kant, nor the argument popularised in the twentieth century by the likes as C.S. Lewis, H.P. Owen and William Lane Craig. For a start, I know of no natural theologian who defends a moral argument consisting only of one premise and a conclusion! And Sagan’s comment that ‘The degree to which humans can be said to be moral beings without the existence of some police force is open at least to debate’ (p. 159) is a red herring plain and simple, as his suggestion that moral behaviour and feelings might plausibly be thought to evolve. What if they did? The question of concern to the moral argument is not the process by which humans come to know about moral values, nor how it is that humans behave as

well as they often do, but rather whether an objective distinction between right and wrong really exists, and if so, how its existence is to be explained. Hence the moral argument can be expressed in one logically valid syllogism:

- 1) Objective Moral values exist
- 2) Objective Moral values require the existence of a god
- 3) Therefore, a god exists

If Sagan really means to suggest that moral values are ‘nothing but’ feelings and/or behaviour caused by a wholly naturalistic evolutionary process, then he is in effect calling into doubt the first premise of the moral argument – translating away talk of moral values into talk of contingent historical events and subjective feelings and ‘survival value’; but the pragmatic material calculus of ‘survival value’ in a naturalistic scheme cannot amount to the qualitative reality of *moral value*. Sagan says he is all for ‘taking care of children’, but does he really want to reduce this claim to the claim that ‘Natural selection can make us do it, and almost surely did’ (p. 159) – a claim that must of course apply with equality to the mother who smothers her child, or the father who rapes his own progeny. If nature is all that there is, then there is nothing above and beyond what nature is, nothing transcendent by which to judge, to praise or to condemn its out-workings.

As for the second premise: On the one hand, for morality to be objective, by definition it cannot be rooted in finite persons but must transcend individual and corporate humanity. On the other hand, because objective morality prescribes and obligates our behaviour, it must be rooted in *something personal*, since only persons can prescribe and obligate behaviour. Moral intuitions are about duties; but we can only have a duty to a person. In the moral law we meet objective prescriptions we are obligated to obey, but only persons make prescriptions (when did you last hear a banana demand anything?) or obligate us (can you be obligated by a banana?). Therefore, there must be a personal moral-law prescriber and obligator beyond individual and collective humanity. If a moral value is an objective command that humans receive, there must be an objective and personal moral commander. As H.P. Owen argued:

‘On the one hand [objective moral] claims transcend every human person... On the other hand... it is contradictory to assert that impersonal claims are entitled to the allegiance of our wills. The only solution to this paradox is to suppose that the order of [objective moral] claims... is in fact rooted in the personality of God.’¹⁰³

What about the first premise? I do not have room here for anything like a proper defence of the objectivity of moral values. Rather, I will simply note that anyone who wants to rebut the above moral argument by denying its first premise thereby gives up any right to using the problem of evil as an argument against traditional monotheism, for the problem of evil is of course the argument that because objective evil exists an objectively perfect being cannot exist. I have already indicated that contemporary philosophers have largely abandoned the claim that the existence of evil contradicts the existence of God (the second premise of the problem of evil argument), but anyone granting the first premise of the problem of evil thereby grants the first premise of the moral argument.

Conclusion

It seems to me that the arguments of natural theology are quite able to withstand Sagan's attempted dissection intact, and that even those who think there is something to the problem of evil must be prepared to weigh this against the positive evidence for theism.

Recommended Resources

Video

William Lane Craig, 'The Moral Argument' @ www.leestrobelt.com/videos/Creator/strobelT1199.htm

J.P. Moreland, 'Right and Wrong as a Key to the Meaning of the Universe' @ http://webcast.ucsd.edu:8080/ramgen/UCSD_TV/8008.rm

Lee Strobel: 'The fulfilment of Old Testament prophecy in the life of Jesus' @ www.leestrobelt.com/videos/Christ/strobelT1066.htm

Lee Strobel: 'Christ's Death and Resurrection in Prophecy – Part One' @ www.youtube.com/watch?v=-1R98UuYIZ0

Lee Strobel: 'Christ's Death and Resurrection in Prophecy – Part Two' @ www.youtube.com/watch?v=zXEhZi5rPFU&NR=1

Audio

Peter Kreeft, 'A Refutation of Moral Relativism' @ www.peterkreeft.com/audio/05_relativism/refutation-of-relativism.mp3

Papers

Francis J. Beckwith, 'Why I Am Not A Moral Relativist' @ www.theapologiaproject.org/Why%20I%20Am%20Not%20A%20Moral%20Relativist.pdf

John A. Bloom, 'Is fulfilled prophecy of value for scholarly apologetics?' @ www.apologetics.com/default.jsp?bodycontent=articles/biblical_apologetics/bloom-prophecy.html&pagetitle=Is+Fulfilled+Prophecy+of+Value+for+Scholarly+Apologetics?

Paul Copan, 'The Moral Argument for God's Existence' @ www.4truth.net/site/apps/nl/content3.asp?c=hiKXLbPNLrF&b=778665&ct=1264233

Josh McDowell, 'Messianic Prophecies Fulfilled in Jesus' @ www.greatcom.org/resources/areadydefense/ch19/default.htm

Hugh Ross, 'Fulfilled Prophecy: Evidence for the Reliability of the Bible' @ www.reasons.org/resources/apologetics/prophecy.shtml

Granville Sewell, 'Evolution and the Second Law of Thermodynamics' @ www.iscid.org/papers/Sewell_EvolutionThermodynamics_012304.pdf

Books

Paul Copan, *That's Just Your Interpretation: Responding to Skeptics Who Challenge Your Faith*, (Baker, 2001)

Ralph O. Muncaster, *Does the Bible Predict the Future?*, (Harvest House, 2001)

Part IV

Having comprehensively failed to show that natural theology is a lost cause (cf. Part III), Sagan ends his Gifford Lecture's by turning the spotlight upon religion as a sociological phenomena with its roots in our evolutionary psychology.

Sagan does avoid the 'genetic fallacy' of thinking that providing a plausible account of the origins of religion in some way undermines the truth-claims of religion. A naturalistic account of religion is compatible with the religious viewpoint. It is only a *metaphysically naturalistic* account of religion that stands in contradiction to the religious viewpoint; and the metaphysical status of a naturalistic account of religion cannot be determined with reference to the account in isolation. For example, if a propensity to believe in the Transcendent is built into humanity by our evolutionary history – is that history 'nothing but' a matter of contingent happenstance, or is it in some way teleologically related to the Transcendent? Simply from looking at the historical process, one cannot rule out an underlying intent. Hence Sagan proceeds on the metaphysical assumption that religion is a false viewpoint in need of understanding and explanation. But as Part's I-III of this review indicate, I do not think we are under any compulsion to grant Sagan this assumption.

The Origins of Religion

Nor are we under any compulsion to accept that Sagan's account of the origins of religion is true. As Sagan admits:

'Clearly there are no observers in our time who were present hundreds of thousands of years ago, and there can be no confident assertions on this subject. All we can have is differing degrees of plausibility.' (p. 174)

The thing is, Sagan's historical account isn't particularly plausible. For example, he observes of ancient humanity that:

'Whatever our feelings and thoughts and approaches to the world were then, they must have been selectively advantageous, because we have done rather well.' (p. 170)

But this evinces a simplistic understanding of evolution, for in evolutionary theory not every surviving trait does have to be advantageous. Rather, every surviving trait has to be *not sufficiently disadvantageous* so as to prevent reproduction! Natural selection weeds out what doesn't work, thereby promoting the best available *composite* of features. But if a feature that is disadvantageous when considered in isolation is somehow linked to a feature of great advantage, then the disadvantageous feature may be propagated on the back of the advantageous feature.

Whether the evolution be biological or sociological, it is all too easy to concoct a simplistic 'just-so' story that beautifully fits one's pre-conceived conclusions and the limited evidence available to us, and which moves surreptitiously in the mind of story-teller and listener alike from the realm of 'could be true' to the realm of 'established scientific fact'. For example, Sagan describes how adrenaline triggers:

‘the flight-or-fight syndrome. This molecule makes you either aggressive or, if you want to think about running away, cowardly, one or the other. Very remarkable that two such apparently contradictory emotions can be brought about by the same molecule.’ (p. 181-182)

He proceeds to spin a ‘just-so’ story:

‘Consider our remote ancestors faced with... hyenas, not yet having deduced that hyenas with fangs bared are dangerous. It would be too inefficient to have our ancestor consciously stop and think, “Oh, I see those beasts have sharp teeth; they probably can eat somebody. They’re coming at me. Maybe I should run away.” By then it’s too late. What you need is a quick look at the hyena, and instantly the molecule is produced, and you run away, and later you can figure out what happened. And you can see two populations, one of whom has to slowly think the matter out, the other of whom can rapidly respond to the adrenaline. After a while these guys [the reactors] leave lots of offspring, those guys [the thinkers] don’t. Everybody winds up generating adrenaline. Natural selection. Not hard to understand how it comes about.’ (p. 182)

Note, first of all, that this is not actually an explanation of the *origin* of adrenaline and/or the flight-or-fight response, but rather an explanation of its presumed shift from low to universal incidence in a population. But how long, *exactly*, does it take to deduce that hyenas (etc.) might be dangerous and that running away might be a good idea? Why must our would-be ancestors think the matter out ‘slowly’, rather than with alacrity? Even if hyena-wary conclusions are not reached *a priori* (quickly or otherwise), one narrowly survived fight with a hyena, a single observed instance of someone else failing to best a hyena, and one would have thought that the message might hit home efficiently enough. One might even think that word of this conclusion (literal or figurative) might spread to those without any hyena experiences of their own. Mightn’t even a fairly slow thoughtful approach to problem solving constitute an over-all survival advantage as compared to molecular-based responses, even if it were a disadvantage in certain hyena intensive situations? Couldn’t the same hyena story just as easily be used to ‘explain’ how the knack of quick-thinking spread from a few ancestors lucky enough to be good at it to the ancestral population as a whole? But if the same story can be used to ‘explain’ such apparently contradictory facets of human nature as deductive reason and instinctive reaction, can it really be said to explain either? And, since Sagan notes that the very same molecule can trigger not only the urge to flee, but also the urge to stand and fight, why is it that our hypothetical ancestors in Sagan’s story all flee and survive to pass on their adrenaline-producing genes, rather than heroically but uselessly standing up to the hyenas and their bared teeth, thereby removing themselves from the gene-pool? Sagan’s story stacks the deck in its own favour. Perhaps the real explanation is more complicated.

If the real explanation is likely to be more complex, Sagan’s story can’t be treated as more than the merest sketch of a speculation about how things might have happened. Building any scientific or metaphysical hypothesis upon such a ‘just-so’ story would amount to erecting a house of cards. Nor, given the sketchy nature of such a ‘just-so’ story, can it simply be assumed that the real explanation doesn’t contradict any of the assumptions – scientific or metaphysical - that this ‘just-so’ story was shaped to fit. More to the point, Sagan’s explanation for the origin of religion has exactly this ‘just-

so' nature, and so it would be wise neither to put too much stock in his explanation, nor to build metaphysical houses upon it.

Sagan follows previous Gifford Lecturer James Frazer's *The Golden Bough* (1912) in suggesting that religion began with a belief in animism and an attempt to gain control over nature by showing reverence to the forces thought to control it:

'One thing we do if we believe that there is a god of the thunderbolt and do not wish to be hit by a thunderbolt is to propitiate the god of the thunderbolt, to do something to calm him down... to show our respect for him... And many cultures have such institutionalised propitiation, which sometimes goes as far as human sacrifice...' (p. 174-175)

Of course Sagan is right *up to a point*; but if this story is meant to explain the *origin* of religion *per se* then we need a) some account of why people believe in animism in the first place, and b) some account of why people don't stop being religious when they notice (as they must notice) that propitiating the god of thunder does not necessarily 'calm him down.' If control over nature is the goal of religion, and religion is false and so delivers only 'the illusion that by some sequence of ritual actions we are able to influence forces of nature' (p. 175), then why does religion persist? Why didn't ancient humanity all go the way of the Greek materialists, or at least figure that the gods pay humans no attention and have no favourites?

As Alister McGrath notes: 'The evidence simply isn't there to allow us to speak about any kind of "natural progression" from polytheism to monotheism... The rise of modern anthropology can be seen as a direct reaction to the manifest failures of Frazer's *The Golden Bough* [which] totally lacked any serious basis in systematic empirical study.'¹⁰⁴ In point of fact, there is good reason to believe that religion did *not* begin with animism and 'evolve' from there towards monotheism, as Fraser hypothesised. Quite the reverse. Norman L. Geisler comments:

'Frazer's *The Golden Bough* (1912) has dominated the history of religion for the past few generations. His hypothesis is that religions evolved from animism through polytheism to henotheism and finally monotheism. In spite of its selective and anecdotal use of sources that are outdated by subsequent research, the ideas from the book are still widely believed... There are many arguments in favor of primitive monotheism. Many come from the records and traditions we have of early civilization. These include Genesis, Job, the Ebla Tablets, and the study of preliterate tribes... The origins of polytheism can be explained as well, if not better, as a degeneration from original monotheism... This is evident in the fact that most pre-literate religions have a latent monotheism in their view of the Sky God or High God... there is every evidence to believe that monotheism was the first religion from which others Devolved...' ¹⁰⁵

As G.K. Chesterton argued in 1925:

'They are obsessed by their evolutionary monomania that every great thing grows from a seed, or something smaller than itself. They seem to forget that every seed comes from a tree, or from something larger than itself. Now there

is very good ground for guessing that religion did not originally come from some detail that was forgotten because it was too small to be traced. Much more probably it was an idea that was abandoned because it was too large to be managed. There is very good reason to suppose that many people did begin with the simple but overwhelming idea of one God who governs all; and afterwards fell away into such things as demon-worship... Some of the very rudest [i.e. primitive] savages [i.e. un-industrialised indigenous peoples], primitive in every sense in which anthropologists use the word, the Australian aborigines for instance, are found to have a pure monotheism with a high moral tone... He is worshiped by the simplest tribes with no trace of ghosts or grave-offerings, or any of the complications in which Herbert Spenser or Grant Allen sought the origin of the simplest of all ideas. Whatever else there was, there was never any such thing as the Evolution of the Idea of God. The idea was concealed, was a voided, was almost forgotten, was even explained away; but it was never evolved.¹⁰⁶

Chesterton pointed to the God-implying shadow of the divine absence that hangs over ancient pagan philosophy and religion:

‘The best authorities seem to think that though Confucianism is in one sense agnosticism, it does not directly contradict the old theism, precisely because it has become a rather vague theism. It is one in which God is called Heaven, as in the case of polite persons tempted to swear in drawing-rooms. But Heaven is still overheard, even if it is very far overheard. We have all the impression of a simple truth that has receded, until it was remote without ceasing to be true. And this phrase alone would bring us back to the same idea even in the pagan mythology of the West. There is surely something of this very notion of the withdrawal of some higher power in all those mysterious and very imaginative myths about the separation of earth and sky. In a hundred forms we are told that heaven and earth were once lovers, or were once at one, when some upstart thing, often some undutiful child, thrust them apart; and the world was built on an abyss; upon a division and a parting... mythology grows more and more complicated, and the very complication suggests that at the beginning it was more simple... there is therefore a very good case for the suggestion that man began with monotheism before it developed or degenerated into polytheism.’¹⁰⁷

Perhaps one is tempted to say, in response to Chesterton, that he is simply spinning a plausible story to fit a minimal amount of hard evidence (or an interpretation thereof). Personally, I find Chesterton’s story far more plausible than Sagan’s; but if Chesterton’s story is speculative, then so too is Sagan’s.

Sagan’s equates Jewish and Christian beliefs about sacrifice with animistic beliefs about the course of nature being ‘different from what it otherwise would be. It provides the illusion that by some sequence of ritual actions we are able to influence forces of nature’ (p. 175) But of course, Judeo-Christian beliefs about sacrifice have nothing to do with influencing the course of *nature*, and everything to do with altering human standing in relation to concepts such as moral wrong (sin) and forgiveness. And far from sacrifice being a human ruse to influence God, in the Judeo-Christian

tradition one might very well say that the sacrifice (whether a goat or Jesus himself) is a divine ruse to influence humans!

On the assumption that contemporary so-called 'primate' cultures they will give insight into 'primitive' cultures of the distant past, Sagan compares the !Kung of the Kalahari Desert with the Jivaro of the Amazon Valley. It is worth pausing to question Sagan's assumption with Chesterton:

'Of course most of these speculators who are talking about primitive men are thinking about modern savages. They prove their progressive evolution by assuming that a great part of the human race has not progressed or evolved; or even changed in any way at all... Modern savages cannot be exactly like primitive man, because they are not primitive. Modern savages are not ancient because they are modern. Something has happened to their races as much as to ours, during the thousands of years of our existence and endurance on the earth. They have had some experiences, and have presumably acted on them... They have had some environment, and even some change of environment, and have presumably adapted themselves to it in a proper and decorous evolutionary manner.'¹⁰⁸

The !Kung are described by Sagan in glowing terms. There is a sexual division of labour, but little social hierarchy. Children are loved and warfare rare. There is the encouragement of religious experiences through the use of hallucinogens. The Jivaro, on the other hand, torture their enemies, brutalize their children, and drink alcohol. And they believe in a Supreme Creator God. Sagan hammers home the point with reference to a statistical correlation taken from the work of neuropsychologist James Prescott¹⁰⁹ (a member of the Board of Directors of the American Humanist Association):

'the things that apparently go with each other are essentially the two sets of characteristics I just described. It is Prescott's view that there are causal relations. That, in fact, in his view the key distinction has to do with whether cultures hug their children and whether they permit premarital sexual activity among adolescents. In his view these are the keys. And he concludes that all cultures in which the children are hugged and the teenagers can have sex wind up without powerful social hierarchies and everybody's happy. And those cultures in which the children are not permitted to be hugged... and a premarital adolescent sexual taboo is strictly enforced wind up killing, hating, and having powerful dominance hierarchies.' (p. 173)

These two sets of comments are apt to lead the unwary reader to conclude that societies which believe in a Supreme Creator God are bad and that societies which don't are good. Sagan denies that this is his intent:

'Now, you cannot prove a causal sequence from a statistical correlation. And you could just as well argue that what the religious forms are determines everything or what the sacrament is has a powerful connection, between societies with alcohol and the societies that torture their enemies and abuse women and so on.' (p. 173)

Besides, what would such a theory make of Christianity, which believes in a Supreme Creator God, uses alcohol as a sacrament and makes extra-marital sex taboo, but which ‘says not just abide your enemy, not just tolerate him, love him... No ifs, ands, or buts’ (p. 208-209), which says to love children, and which greatly elevates the place of women compared to the way of things in the ancient world?

Prescott’s study has been criticised for biased data collection and inadequate statistical analysis¹¹⁰, so it is fortunate – if somewhat bemusing - that all Sagan claims on the back of anthropological studies is that:

‘there are two and probably a multiplicity of ways of being human. That these cultures... must be within us... that is, a hardwired circuit in our brains that permits us to fit... into some dominance hierarchy... And at the same time, we must also have some predisposition for the antithesis...’ (p. 173-174)

Indeed. But there is no either/or here. After all, Christianity sets up a strict hierarchical relationship between God and humanity, on the basis of which it proclaims that all people are equally made ‘in the image of God’ (Genesis 1:27), and that for believers: ‘There is neither Jew nor Greek, slave nor free, male nor female, for you are all one in Christ Jesus.’ (Galatians 3:28)

Prayer – What is it Good For?

Sagan recounts Francis Galton’s (somewhat tendentious) attempts to place the study of prayer on a scientific footing, which he laments: ‘has not led to a school of people who do statistical tests of the efficacy of prayer.’ (p. 177) Once again, the intervening years have seen interesting developments in the sort of research that Sagan calls for. Of course, Sagan is correct when he notes that:

‘There is no question that there is something about prayer that seems to work. Surely it provides solace and comfort. It’s a way of working through problems. It’s a way of reviewing events that have happened, of connecting the past to the future. It does some good.’ (p. 177)

But Sagan opines that this: ‘doesn’t say anything about the existence of a god. It doesn’t say anything about the external world. It is a procedure, which on some level makes us feel better.’ (p. 177) I don’t accept Sagan’s assumptions that such prayer as he thinks useful is nothing but a procedure that works, or that prayer can only have something to say about the existence of God if it makes a difference to the external rather than the internal world. But rather than arguing the toss, let’s join Galton’s game of statistical investigation into what is rather blasphemously called ‘the efficacy of prayer’.

A systematic review of the efficacy of distant healing published in 2000 concluded that: ‘approximately 57% (13 of 23) of the randomised, placebo-controlled trials of distant healing... showed a positive treatment effect’.¹¹¹ Moreover:

‘David R. Hodge, an assistant professor of social work in the College of Human Services at Arizona State University, conducted a comprehensive

analysis of 17 major studies on the effects of intercessory prayer... among people with psychological or medical problems. He found a positive effect.’¹¹²

Hodge’s meta-analysis was featured in the March 2007 issue of *Research on Social Work Practice*. According to Hodge:

‘This is the most thorough and all-inclusive study of its kind on this controversial subject that I am aware of... It suggests that more research on the topic may be warranted, and that praying for people with psychological or medical problems may help them recover... Overall, the meta-analysis indicates that prayer is effective.’¹¹³

For example:

- Dr [Randolf] Byrd divided 393 heart patients into two groups. One was prayed for by Christians; the other did not receive prayers from study participants. Patients didn’t know which group they belonged to. The members of the group that was prayed for experienced fewer complications, fewer cases of pneumonia, fewer cardiac arrests, less congestive heart failure and needed fewer antibiotics.¹¹⁴
- Dr Dale Matthews documents how volunteers prayed for selected patients with rheumatoid arthritis: ‘To avoid a possible placebo effect from knowing they were being prayed for, the patients were not told which ones were subjects of the test. The recovery rate among those prayed for was measurably higher than among a control group, for which prayers were not offered.’¹¹⁵

So there is at least some scientific evidence for the efficacy of prayer in the external world. Given Sagan’s sceptical approach to miracles (which he inaccurately compares to the request that twice two not equal four) it is interesting that he even calls for the research, now carried out, the results of which stand in *prima facie* tension with his naturalistic assumptions.

The Historical Jesus

Sagan inaccurately asserts that: ‘The only evidence for the existence of Jesus is the four Gospels and the subsequent books. And apart from that, there is merely the account of Josephus.’ (p. 237) This is not true¹¹⁶; but even if it were, the evidence Sagan accepts is more than sufficient. Sagan admits: ‘I find the accounts in the Gospels reasonably internally consistent, and I don’t see any particular problem about Jesus as a historical figure in the same sense as Mohammed and Moses and Buddha.’ (p. 237) However, Sagan is not willing to take the historical evidence concerning Jesus, Mohammed, Moses or Buddha at face level, saying: ‘I think the least unsatisfactory hypothesis is that they were real people, genuine historical figures, great men, the details of whose lives and missions have been, of course, distorted by subsequent advocates and enemies both.’ (p. 237) No argument for the unreliability of our data on Jesus is offered, but one can see why someone who thinks that ‘The definitive work on miracles was written by... David Hume’ (p. 136) might ride roughshod over the historical evidence here – for that is exactly what Sagan is doing.

Religion has its uses

Sagan is to be commended for avoiding the partisan, religion-phobic rhetoric of the New Atheism purveyed by Dawkins, Grayling *et al.* He is actually keen to emphasise various positive aspects of religion for society:

‘It seems to me that there are many respects in which religion can play a benign, useful, salutary, practical, functional role in the prevention of nuclear war...religious people played a role in the abolition of slavery in the United States, and elsewhere. Religions played a fundamental role in the independence movement in India and in other countries and in the civil rights movement in the United States. Religions and religious leaders have played very important roles in getting the human species out of situations that we should never have gotten into that profoundly compromised our ability to survive, and there is no reason religions could not in the future take on similar roles... Religions, because they are institutionalized and have many adherents, are able to provide role models, to demonstrate that acts of conscience are creditable, are respectable... Religions can combat fatalism. They can engender hope. They can clarify our bond with other human beings all over the planet. They can remind us that we are all in this together.’(p. 205-207)

As we have already seen, Sagan highlights Jesus’ unique elucidation of the Golden Rule: ‘it’s that strong statement of the Golden Rule that sets Christianity apart.’ (p. 209)

However, because Sagan rejects the truth of all religious viewpoints (excepting his own secular humanism), he judges religion against the criteria of pragmatic usefulness. Indeed, Sagan is overwhelmingly concerned with species survival, and whether or not religion detracts from or contributes to such survival. He thinks, on balance, that it probably contributes. Whether or not he is right about this, there is something wrong with his survival criteria; for in discussing the question of purpose Sagan, having rejected the existence of a purposer *of* life, naturally rejects any given purpose given *to* life:

‘I would say that purpose is not imposed from the outside; it is generated from the inside. We make our purpose. And there is a kind of dereliction of duty of us humans when we say that the purpose is to be imposed on the outside...’ (p. 227)

This existentialism is self-contradictory. If there is no objective purpose, then we cannot be guilty of any ‘dereliction’ of that purpose in saying that there is an objective purpose given to existence from ‘the outside’! Moreover, any subjective purpose we invent remains our own invented, subjective purpose that is quite likely to be at cross-purposes with the subjective purposes of others. We may, like Sagan, embrace the subjective purpose of having the human species survive – but such a personal choice is forever doomed to remain on entirely equal terms with the personal choice to push the big red destruct button on humanity. Sagan thinks that:

‘Extinction undoes the human enterprise. Extinction makes pointless the activities of all our ancestors back those hundreds of thousands or millions of years.’ (p. 204)

But in that case, unless he thinks humanity is going to live literally forever in the cosmos despite the fact that ‘Most species become extinct’ (p. 204), Sagan’s own views entail the conclusion that life is pointless *at present!*

Sagan clearly wants to say that the human struggle is *not* pointless at present, and that we have an actual duty not to destroy the earth in nuclear war - ‘we have many obligations to guarantee our purposes, one of which is to survive’ (p. 227) – but he rejects the metaphysical apparatus necessary to making such a claim coherent. That metaphysical apparatus is of course belief in the existence of a Personal Transcendent Creator, i.e. ‘God’.

On the other hand, the metaphysical view that makes a belief in *objective* ‘purpose’ and ‘duty’ (such as a purpose that excludes the extinction of humanity and a duty not to destroy ourselves) coherent is also the view that demotes survival from the position of supreme importance it occupies in Sagan’s ethic. For Sagan thinks that if past generations have struggled for anything, ‘it was the survival of our species.’ (p. 204) Yet it seems to me that very few people have historically been concerned with the survival of our species. They have been concerned with all sorts of other things, including eternal things that Sagan’s worldview excludes from consideration. Besides which, if the moral argument is correct (cf. Part III), Sagan is unable to justify attaching any objective moral value to the idol of ‘survival’. Sagan thinks that: ‘the preservation of life is essential if the religion is to continue. Or anything else.’ (p. 205) But of course, if Christianity is true, Sagan is wrong about this for the simple reason that the cosmos is *not* all there ever was, nor all there is, nor all there ever will be.

Conclusion

Sagan’s critical musings about religion range from the implausible (e.g. that animism preceded monotheism), to the self-contradictory (e.g. that life is without purpose but that we have an objective duty to create our own purpose).

As I bring this review to a close, my general impression is that Sagan’s Gifford Lectures display a far-ranging ignorance of serious philosophical and theological scholarship. Sagan is often guilty of attacking a ‘straw-man’ and makes several arguments that are logically invalid (which beg-the-question or even contradict themselves), but even when his logic is valid, his crucial premises are less plausible (sometimes far less plausible) than their denials.

The over two decade gap between Sagan’s lectures and their publication provides a fascinating glimpse into the way in which the march of scientific discovery has actually *added* weight to the case for a theistic worldview. As we have seen, whether one considers the fields of cosmology, astrobiology, or studies into the efficacy of prayer, science has in each case produced results that are uncomfortable for adherents of a naturalistic worldview.

Reading Sagan does at least provide a welcome break from the acerbic rhetoric of the ‘New Atheism’. Whether or not he always succeeds (and which of us does), Sagan obviously attempts to be fair-minded in his exploration of the interface between science and religion, and for this he should be praised. So allow me to end with a quote from Sagan with which I am in wholehearted agreement:

‘I would suggest that science is, at least in part, informed worship. My deeply held belief is that if a god of anything like the traditional sort exists, then our curiosity and intelligence are provided by such a god. We would be unappreciative of those gifts if we suppressed our passion to explore the universe and ourselves.’ (p. 31)

Recommended Resources

Carl Sagan Portal @ www.carlsagan.com/

Wikipedia: Carl Sagan @ http://en.wikipedia.org/wiki/Carl_Sagan

G.K. Chesterton, *The Everlasting Man* @ www.worldinvisible.com/library/chesterton/everlasting/content.htm

Rich Deem, ‘Scientific Evidence for Answered Prayer’ @ www.godandscience.org/apologetics/prayer.html

Norman L. Geisler, ‘Primitive Monotheism’ @ www.ses.edu/journal/articles/1.1Geisler.pdf

Gary R. Habermas, ‘Ancient Non-Christian Sources’ @ www.garyhabermas.com/books/historicaljesus/historicaljesus.htm#ch9

Lara E. Pizzorno, ‘Spirituality in Health and Healing’ @ www.nat-med.com/archives/spirituality.htm

Peter S. Williams, ‘The Shroud of Turin: A Cumulative Case for Authenticity’ @ www.case.edu.au/uploads/media/The_20Shroud_20of_20Turin.pdf

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- ³⁶ On the problems this would cause, cf. Dan Vergano, 'Finding "Super Earth" is a "Goldilocks" errand' @ www.usatoday.com/tech/science/columnist/vergano/2006-02-19-super-earth_x.htm
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The same report mentions the possibility that atmospheric conditions on Gliese 581d might result in a greenhouse effect that brings its temperature within the range required for liquid water, despite the planet orbiting outside the 'Goldilocks Zone' inhabited by Gliese 581c. Of course, there may not be any water on 581d. Moreover, 581d suffers the drawback of being even more massive than 581c, at eight times the mass of Earth.
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