

God's Undertaker: Has Science buried God?

By: John C. Lennox

Preface

- Why is there something rather than nothing? Why, in particular, does the universe exist? Where did it come from and where, if anywhere, is it heading? Is it itself the ultimate reality behind which there is nothing or is there something 'beyond' it? Can we ask with Richard Feynman: 'What is the meaning of it all?' Or was Bertrand Russell right when he said that 'The universe is just there, and that's all'? [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 7]
- Is human life ultimately only one, admittedly improbable, but nevertheless fortuitous, arrangement of atoms among many? In any case, how could we be in any sense special since we now know that we inhabit a tiny planet orbiting a fairly undistinguished star far out in an arm of a spiral galaxy containing billions of similar stars, a galaxy that is only one of billions distributed throughout the vastness of space? [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 7]
- Peter Atkins, Professor of Chemistry at Oxford University, while acknowledging the religious element in the history of the genesis of science, defends this view with characteristic vigour: 'Science, the system of belief founded securely on publicly shared reproducible knowledge, emerged from religion. As science discarded its chrysalis to become its present butterfly, it took over the heath. There is no reason to suppose that science cannot deal with every aspect of existence. Only the religious – among whom I include not only the prejudiced but the underinformed – hope there is a dark corner of the physical universe, or of the universe of experience, that science can never hope to illuminate. But science has never encountered a barrier, and the only grounds for supposing that reductionism will fail are pessimism on the part of scientists and fear in the minds of the religious.' ['The Limitless

Power of Science' in Nature's Imagination – The Frontiers of Scientific Vision, Ed. John Cornwell, Oxford, Oxford University Press, 1995 p. 125] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 8]

- So, is naturalism actually demanded by science? Or is it just conceivable that naturalism is a philosophy that is brought to science, more than something that is entailed by science? Could it even be, dare one ask, more like an expression of faith, akin to religious faith? [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 9]
- Why are they now so convinced that atheism is the only intellectually tenable position? Is it really true that everything in science points towards atheism? Are science and atheism such natural bedfellows? [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 10]
- Suppose we were to ask the parallel questions: Is theism science? Is atheism science? Most people would give a negative answer. But if we were now to say that what we are really interested in is whether there is any scientific evidence for theism (or for atheism), then we are likely to be faced with the reply: Why, then, did you not say so? [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 12]
- Is there any scientific evidence for design? If this is how the question should be understood, then it should be expressed accordingly in order to avoid the kind of misunderstanding exhibited by the statement made in the Dover trial 'that ID is an interesting theological argument, but that it is not science.' [Kitzmiller, 400 F.Supp.2d 707, 746.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 12]
- In a fascinating article, 'Public Education and Intelligent Design' [Philosophy & Public Affairs, Wiley InterScience, Vol. 36, Issue 2, 2008], Thomas Nagel of New York, a prominent atheist professor of philosophy, writes: 'The purposes and intentions of God, if there is a god, and the nature of his will, are not possible subjects of a scientific theory or scientific explanation. But that does not imply that there cannot be scientific evidence for or against the intervention of such a non-law-governed cause in the natural order.' [op. cit. p. 190.] ... 'ID is very different from creation science.' [op. cit. p. 196.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc

2009, Page 12]

- The question that is central to this book turns out to be in essence a worldview question: which worldview sits most comfortably with science – theism or atheism? Has science buried God or not? Let us see where the evidence leads. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 14]

1. War of the Worldviews

- Oxford Chemistry Professor Peter Atkins writes: 'Humanity should accept that science has eliminated the justification for believing in cosmic purpose, and that any survival of purpose is inspired only by sentiment.' ['Will science ever fail?' *New Scientist*, 8 Aug 1992, pp. 32–35.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 15]
- Richard Dawkins goes a step further. He regards faith in God as an evil to be eliminated: 'It is fashionable to wax apocalyptic about the threat to humanity posed by the AIDS virus, "mad cow" disease and many others, but I think that a case can be made that faith is one of the world's great evils, comparable to the smallpox virus but harder to eradicate. Faith, being belief that isn't based on evidence, is the principal vice of any religion.' ['Is science a religion?' *The Humanist*, Jan/Feb 1997, pp. 26–39.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 15, 16]
- Dawkins: 'scientific belief is based upon publicly checkable evidence, religious faith not only lacks evidence; its independence from evidence is its joy, shouted from the rooftops'. [*Daily Telegraph Science Extra*, Sept 11, 1989.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 16]
- Francis Collins says of Dawkins' definition that it 'certainly does not describe the faith of most serious believers in history, nor of most of those in my personal acquaintance'. [*The Language of God*, New York, Free Press, 2006 p. 164.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 17]
- As John Haught says: 'Even one white crow is enough to show that not all crows are black, so surely the existence of countless believers who reject the new atheists' simplistic definition of faith is enough to place in question the applicability of their critiques to a significant section of the religious

population.’ [God and the New Atheists, Louisville, Westminster John Knox Press, 2008, p.62.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 17]

- Dawkins: ‘Next time that somebody tells you that something is true, why not say to them: “What kind of evidence is there for that?” And if they can’t give you a good answer, I hope you’ll think very carefully before you believe a word they say’? [A Devil’s Chaplain, London, Weidenfeld and Nicholson, 2003, p. 248] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 17]
- In this vein Peter Atkins writes: ‘Science and religion cannot be reconciled, and humanity should begin to appreciate the power of its child, and to beat off all attempts at compromise. Religion has failed, and its failures should stand exposed. Science, with its currently successful pursuit of universal competence through the identification of the minimal, the supreme delight of the intellect, should be acknowledged king.’ [Nature’s Imagination – The Frontiers of Scientific Vision, Ed. John Cornwell, Oxford Oxford University Press, 1995 p. 132.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 19]
- Sir John Houghton FRS writes: ‘Our science is God’s science. He holds the responsibility for the whole scientific story... The remarkable order, consistency, reliability and fascinating complexity found in the scientific description of the universe are reflections of the order, consistency, reliability and complexity of God’s activity.’ [The Search for God – Can Science Help?, Oxford, Lion, 1995 p.59.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 19]
- Sir Ghillean Prance FRS, gives equally clear expression to his faith: ‘For many years I have believed that God is the great designer behind all nature... All my studies in science since then have confirmed my faith. I regard the Bible as my principal source of authority.’ [God and the Scientists, compiled by Mike Poole, CPO 1997.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 19, 20]
- The statements just listed are not statements of science either, but statements of personal belief. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 20]

- In particular, which, if any, of these two diametrically opposing worldviews of theism and atheism does science support? [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 20]
- At the heart of all science lies the conviction that the universe is orderly. Without this deep conviction science would not be possible. So we are entitled to ask: Where does the conviction come from? [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 20]
- Melvin Calvin, Nobel Prize-winner in biochemistry, seems in little doubt about its provenance: 'As I try to discern the origin of that conviction, I seem to find it in a basic notion discovered 2,000 or 3,000 years ago, and enunciated first in the Western world by the ancient Hebrews: namely that the universe is governed by a single God, and is not the product of the whims of many gods, each governing his own province according to his own laws. This monotheistic view seems to be the historical foundation for modern science.' [Chemical Evolution, Oxford, Clarendon Press, 1969, p. 258] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 20]
- Whitehead asked the obvious question: How could such an explosion of knowledge have happened in such a relatively short time? His answer: 'modern science must come from the medieval insistence on the rationality of God... My explanation is that the faith in the possibility of science, generated antecedently to the development of modern scientific theory, is an unconscious derivative from medieval theology.' [Science and the Modern World, London, Macmillan, 1925, p. 19.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 21]
- 'Men became scientific because they expected law in nature and they expected law in nature because they believed in a lawgiver.' [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 21]
- Men such as Galileo (1564–1642), Kepler (1571–1630), Pascal (1623–62), Boyle (1627–91), Newton (1642–1727), Faraday (1791–1867), Babbage (1791–1871), Mendel (1822–84), Pasteur (1822–95), Kelvin (1824–1907) and Clerk Maxwell (1831–79) were theists; most of them, in fact, were Christians. [John C. Lennox: *God's Undertaker: Has Science buried God?*,

Lion Hudson plc 2009, Page 21]

- Johannes Kepler described his motivation thus: ‘The chief aim of all investigations of the external world should be to discover the rational order which has been imposed on it by God, and which he revealed to us in the language of mathematics.’ [Cited in Morris Kline, *Mathematics: The Loss of Certainty*, (Oxford University Press, New York, 1980, p. 31.) [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 21]
- What we are suggesting is that the doctrine of a unique Creator God who is responsible for the existence and order of the universe has played an important role. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 22]
- John Brooke, Oxford’s first Professor of Science and Religion, is more cautious than Torrance: ‘In the past religious beliefs have served as a presupposition of the scientific enterprise insofar as they have underwritten that uniformity... a doctrine of creation could give coherence to scientific endeavour insofar as it implied a dependable order behind the flux of nature. ... this need not entail the strong claim that without a prior theology, science would never have taken off, but it does mean that the particular conceptions of science held by its pioneers were often informed by theological and metaphysical beliefs.’ [John Brooke, *Science & Religion: Some Historical Perspectives*, Cambridge, Cambridge University Press, 1991, p. 19.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 22, 23]
- That fundamental shift in perspective was made much easier by the notion of a contingent creation – that is, that God the Creator could have created the universe any way he liked. Hence, in order to find out what the universe is really like or how it actually works, there is no alternative to going and looking. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 23]
- At least that is the way that Galileo perceived it. For in his famous Letter to the Grand Duchess Christina (1615) he claims that it was the academic professors who were so opposed to him that they were trying to influence the church authorities to speak out against him. The issue at stake for the

professors was clear: Galileo's scientific arguments were threatening the all-pervading Aristotelianism of the academy. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 24]

- Galileo observed sunspots, which blemished the face of Aristotle's 'perfect sun'. In 1604 he saw a supernova, which called into question Aristotle's 'immutable heavens'. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 24]
- There is, of course, no excuse whatsoever for the Roman Catholic Church's use of the power of the Inquisition to muzzle Galileo, nor for subsequently taking several centuries 'rehabilitating' him. It should, however, be noted that, again contrary to popular belief, Galileo was never tortured; and his subsequent 'house arrest' was spent, for the most part, in luxurious private residences belonging to friends. [The reader interested in more detail should consult the excellent chapter on Galileo in *Reconstructing Nature*, John Brooke and Geoffrey Cantor, Edinburgh, T&T Clark, 1998.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 25]
- [The] Bible talks of the sun 'rising', it is speaking phenomenologically – that is, giving a description as it appears to an observer, rather than implying commitment to a particular solar and planetary theory. Scientists today do just the same: they also speak in normal conversation of the sun rising, and their statements are not usually taken to imply that they are obscurantist Aristotelians. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 26]
- The important lesson is that we should be humble enough to distinguish between what the Bible says and our interpretations of it. The biblical text just might be more sophisticated than we first imagined and we might therefore be in danger of using it to support ideas that it never intended to teach. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 26]
- Indeed, research has undermined that thesis to such an extent that historian of science Colin Russell can come to the following general conclusion: 'The common belief that ... the actual relations between religion and science over the last few centuries have been marked by deep and enduring hostility ... is

not only historically inaccurate, but actually a caricature so grotesque that what needs to be explained is how it could possibly have achieved any degree of respectability.’ [‘The Conflict Metaphor and its Social Origins’, *Science and Christian Belief*, 1, 3–26, 1989.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 28]

- There is a conflict, a very real one, but it is not really a conflict between science and religion at all. For if that were so, elementary logic would dictate that one would find that scientists were all atheists and only non-scientists believed in God, and this, as we have seen, is simply not the case. No, the real conflict is between two diametrically opposed worldviews: naturalism and theism. They inevitably collide. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 28, 29]
- Whatever their differences, materialism and naturalism are therefore intrinsically atheistic. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 29]
- Thus there is nothing but nature. It is a closed system of cause and effect. There is no realm of the transcendent or supernatural. There is no ‘outside’. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 30]
- Theistic view of the universe: Here is an assertion that the universe is not a closed system but a creation, an artefact of the mind of God, maintained and upheld by him. It is an answer to the question: Why does the universe exist? It exists because God causes it to be. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 30]
- The Genesis statement is a statement of belief, not a statement of science, in exactly the same way as Sagan’s assertion is not a statement of science, but of his personal belief. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 30]
- What we are really asking is: Which worldview does science support, naturalism or theism? [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 30]
- Quantum chemist Henry F. Schaeffer III is in no doubt of his answer either: ‘A Creator must exist. The Big Bang ripples (1992) and subsequent scientific findings are clearly pointing to an ex nihilo creation consistent with the first

few verses of the book of Genesis.’ [‘The Big Bang, Stephen Hawking, and God’, in *Science: Christian Perspectives for the New Millennium*, Addison Texas and Norcross, Georgia, CLM and RZIM Publishers, 2003.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 30]

- In order to tease out the relationship between worldviews and science we must now ask a surprisingly difficult question: What exactly is science? [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 30]

2. The scope and limits of Science

- Michael Ruse. He holds that science ‘by definition deals only with the natural, the repeatable, that which is governed by law’. [Darwinism Defended, Reading, Addison-Wesley, 1982 p 322.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 32]
- However, the most obvious weakness in this definition is that, if allowed to stand, it would rule out most of contemporary cosmology as science. It is hard to see how the standard model for the origin of the universe can be describing anything other than unique events – the origin of the universe is not (easily) repeatable. Cosmologists might understandably be peeved to be told that their activities did not qualify as science. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 32]
- Nobel Prize-winner Werner Heisenberg deduces that ‘the natural laws formulated mathematically in quantum theory no longer deal with the elementary particles themselves but with our knowledge of them’. [The Physicist’s Conception of Nature, London, Hutchinson, 1958 p.15.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 33]
- Professor of Ecology and Evolution Massimo Pigliucci states that ‘The basic assumption of science is that the world can be explained entirely in physical terms, without recourse to godlike entities.’ [In Darwinism, Design and Public Education, John Angus Campbell and Stephen C. Meyer, East Lansing, Michigan State University Press, 2003 p. 195.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 33, 34]

- Nobel Laureate Christian de Duve writes: ‘Scientific enquiry rests on the notion that all manifestations in the universe are explainable in natural terms, without supernatural intervention. Strictly speaking, this notion is not an a priori philosophical stand or profession of belief. It is a postulate, a working hypothesis that we should be prepared to abandon if faced with facts that defy every attempt at rational explanation. Many scientists, however, do not bother to make this distinction, tacitly extrapolating from hypothesis to affirmation. They are perfectly happy with the explanations provided by science. Like Laplace, they have no need for the ‘God hypothesis’ and equate the scientific attitude with agnosticism, if not with outright atheism.’ [Life Evolving, New York, Oxford University Press, 2002, p. 284.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 34]
- the notion that there is a Creator God is a rational notion, not a non-rational one. To equate ‘rational explanation’ with ‘natural explanation’ is at best an indicator of a strong prejudice, at worst a category mistake. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 34]
- Philosopher Paul Kurtz holds similarly that ‘What is common to naturalistic philosophy is its commitment to science. Indeed, naturalism might be defined in its more general sense as the philosophical generalizations of the methods and conclusions of the sciences.’ [Philosophical Essays in Pragmatic Naturalism, Buffalo, New York, Prometheus Books, 1990 p.12.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 34]
- For instance, the immunologist, George Klein, states categorically that his atheism is not based on science, but is an a priori faith commitment. Commenting on a letter in which one of his friends described him as an agnostic, he writes: ‘I am not an agnostic. I am an atheist. My attitude is not based on science, but rather on faith ... The absence of a Creator, the non-existence of God is my childhood faith, my adult belief, unshakable and holy.’ [The Atheist in the Holy City, Cambridge, MA, MIT Press, 1990, p. 203.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 35]

- Similarly, in his review of Carl Sagan’s last book, the Harvard geneticist Richard Lewontin makes it abundantly clear that his materialistic convictions are a priori. He not only confesses that his materialism does not derive from his science, but he also admits, on the contrary, that it is his materialism that actually consciously determines the nature of what he conceives science to be: ‘Our willingness to accept scientific claims that are against common sense is the key to an understanding of the real struggle between science and the supernatural. We take the side of science in spite of the patent absurdity of some of its constructs... in spite of the tolerance of the scientific community for unsubstantiated just-so stories, because we have a prior commitment... to materialism. It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world but, on the contrary, that we are forced by our a priori adherence to material causes to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counter-intuitive, no matter how mystifying to the uninitiated.’ [Review of Carl Sagan’s book *The Demon Haunted World: Science as a Candle in the Dark*, New York Review of Books, January 9, 1997.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 35, 36]
- For example, Ernan McMullin writes: ‘... methodological naturalism does not restrict our study of nature, it just lays down which sort of study qualifies as science. If someone wants to pursue another approach to nature – and there are many others – the methodological naturalist has no reason to object. Scientists have to proceed in this way; the methodology of science gives no purchase on the claim that a particular event or type of event is to be explained by invoking God’s creative action directly.’ [‘Plantinga’s Defence of Special Creation’, *Christian Scholar’s Review*, 1991 p. 57.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 37]
- Suppose we understand it [science] to be investigation of and theorizing about the natural order so that we give weight to what is surely of the essence of true science – that is, a willingness to follow empirical evidence, wherever it leads. The key question now arises as to what happens if our investigations in such areas begin to turn up evidence that conflicts with our worldview

commitment – if such a circumstance is even thinkable. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 38]

- A comment from Thomas Nagel is apposite: 'Of course belief is often controlled by the will; it can even be coerced. The obvious examples are political and religious. But the captive mind is found in subtler form in purely intellectual contexts. One of its strongest motives is the simple hunger for belief itself. Sufferers from this condition find it difficult to tolerate having no opinion for any length of time on a subject that interests them. They may change their opinions easily when there is an alternative that can be adopted without discomfort, but they do not like to be in a condition of suspended judgement.' [Mortal Questions, Cambridge, Cambridge University Press, 1979 p. xi.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 38]
- Science explains. For many people this encapsulates the power and the fascination of science. Science enables us to understand what we did not understand before; and by giving us understanding of nature, it gives us power over nature. But how much does science explain? Are there any limits? [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 39]
- there are those who hold that science is the only way to truth and it can, at least in principle, explain everything. This view is called 'scientism'. Peter Atkins gives a classic expression of this view: 'There is no reason to suppose that science cannot deal with every aspect of existence.' [Nature's Imagination: the Frontiers of Scientific Vision, ed. John Cornwell, Oxford, Oxford University Press, 1995, p. 125.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 39]
- the evaluation of philosophy, literature, art, music lies outside the scope of science strictly so-called. How could science tell us whether a poem is a bad poem or a work of genius? Scarcely by measuring the lengths of the words or the frequencies of the letters occurring in them. How could science possibly tell us whether a painting is a masterpiece or a confused smudge of colours? Certainly not by making a chemical analysis of the paint and the canvas. The teaching of morality likewise lies outside science. Science can

tell you that, if you add strychnine to someone's drink, it will kill them. But science cannot tell you whether it is morally right or wrong to put strychnine into your grandmother's tea so that you can get your hands on her property. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 40]

- All the more surprising that Russell himself appears to have subscribed to this particular view when he wrote: 'Whatever knowledge is attainable, must be attained by scientific methods; and what science cannot discover, mankind cannot know.' [Religion and Science, Oxford, Oxford University Press, 1970, p. 243.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 40, 41]
- How does Russell know this? For his statement is not itself a statement of science and so if it is true then (according to the statement itself) it is unknowable – and yet Russell believes it to be true. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 41]
- Their disciplines, which can cope with questions about the nature and structure of the cake, that is, answering the 'how' questions, cannot answer the 'why' questions connected with the purpose for which the cake was made. ('Why' questions connected with function as distinct from purpose are usually regarded as within the provenance of science.) [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 41]
- The claim that science is the only way to truth is a claim ultimately unworthy of science itself. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 41]
- Nobel Laureate Sir Peter Medawar points this out in his excellent book *Advice to a Young Scientist*: 'There is no quicker way for a scientist to bring discredit upon himself and upon his profession than roundly to declare – particularly when no declaration of any kind is called for – that science knows, or soon will know, the answers to all questions worth asking, and that questions which do not admit a scientific answer are in some way non-questions or "pseudo-questions" that only simpletons ask and only the gullible profess to be able to answer.' Medawar goes on to say, 'The existence of a limit to science is, however, made clear by its inability to

answer childlike elementary questions having to do with first and last things – questions such as: “How did everything begin?”; “What are we all here for?”; “What is the point of living?”.’ He adds that it is to imaginative literature and religion that we must turn for answers to such questions. [Advice to a Young Scientist, London, Harper and Row, 1979, p. 31; see also his book *The Limits of Science*, Oxford, Oxford University Press 1984, p. 66.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 41, 42]

- Francis Collins, Director of the Human Genome Project, also emphasizes this: ‘Science is powerless to answer questions such as “Why did the universe come into being?” “What is the meaning of human existence?” “What happens after we die?”.’ [The Language of God, New York, The Free Press, 2006.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 42]
- Russell: ‘Is the world divided into mind and matter, and, if so, what is mind, what is matter? Is mind subject to matter, or is it possessed of independent powers? Has the universe any unity or purpose? Is it evolving towards some goal? Are there really laws of nature, or do we believe in them only because of our innate love of order? Is man what he seems to the astronomer, a tiny lump of impure carbon and water impotently crawling on a small and unimportant planet? Or is he what he appears to Hamlet? Is there a way of living that is noble and another that is base, or are all ways of living merely futile? ... To such questions no answers can be found in the laboratory.’ [History of Western Philosophy, London, Routledge, 2000, p.13.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 42]
- Austin Farrar writes: ‘Every science picks out an aspect of things in the world and shows how it goes. Everything that lies outside such a field lies outside the scope of that science. And since God is not a part of the world, still less an aspect of it, nothing that is said about God, however truly, can be a statement belonging to any science.’ [A Science of God? London, Geoffrey Bles, 1966, p. 29.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 42, 43]
- Peter Atkins: ‘Science has no need of purpose... all the extraordinary,

wonderful richness of the world can be expressed as growth from the dunghill of purposeless interconnected corruption.’ [Creation Revisited, Harmondsworth, Penguin, 1994, p. 127–28.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 43]

- The statement that only science can lead to truth is not itself deduced from science. It is not a scientific statement but rather a statement about science, that is, it is a metascientific statement. Therefore, if scientism’s basic principle is true, the statement expressing scientism must be false. Scientism refutes itself. Hence it is incoherent. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 43]
- Thus, when theists claim that there is Someone who stands in the same relationship to the universe that Aunt Matilda stands to her cake and that that Someone has revealed why the universe was created, they are not abandoning reason, rationality and evidence at all. They are simply claiming that there are certain questions which unaided reason cannot answer and to answer them we need another source of information – in this instance, revelation from God, to understand and evaluate which, reason is essential. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 44]
- It is likewise a category mistake to suppose that our understanding of the impersonal principles according to which the universe works makes it either unnecessary or impossible to believe in the existence of a personal Creator who designed, made, and upholds the universe. In other words, we should not confuse the mechanisms by which the universe works either with its cause or its upholder. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 45]
- a famous statement made by the French mathematician Laplace is constantly misused to buttress atheism. On being asked by Napoleon where God fitted into his mathematical work, Laplace, quite correctly, replied: ‘Sir, I have no need of that hypothesis.’ Of course God did not appear in Laplace’s mathematical description of how things work, just as Mr Ford would not appear in a scientific description of the laws of internal combustion. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 45, 46]

- Austin Farrer comments on the Laplace incident as follows: ‘Since God is not a rule built into the action of forces, nor is he a block of force, no sentence about God can play a part in physics or astronomy... We may forgive Laplace – he was answering an amateur according to his ignorance, not to say a fool according to his folly. Considered as a serious observation, his remark could scarcely have been more misleading. Laplace and his colleagues had not learned to do without theology; they had merely learned to mind their own business.’ [A Science of God, London, Geoffrey Bles, 1966 pp. 29, 30.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 46]

3. Reduction, reduction, reduction ...

- philosopher Richard Swinburne in his book *Is there a God?* says: ‘Note that I am not postulating a ‘God of the gaps’, a god merely to explain the things that science has not yet explained. I am postulating a God to explain why science explains; I do not deny that science explains, but I postulate God to explain why science explains. The very success of science in showing us how deeply ordered the natural world is provides strong grounds for believing that there is an even deeper cause for that order.’ [Is there a God?, Oxford, Oxford University Press, 1996, p. 68.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 48]
- Swinburne is using inference to the best explanation and saying that God is the best explanation for the explanatory power of science. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 48]
- The point to grasp here is that, because God is not an alternative to science as an explanation, he is not to be understood merely as a God of the gaps. On the contrary, he is the ground of all explanation: it is his existence which gives rise to the very possibility of explanation, scientific or otherwise. It is important to stress this because influential authors such as Richard Dawkins will insist on conceiving of God as an explanatory alternative to science – an idea that is nowhere to be found in theological reflection of any depth. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 48]
- Believing that the engine of the car had been designed by Mr Ford would not

stop anybody from investigating scientifically how the engine worked – in fact it might well spur them on to do so. However, and this is crucial, if they came to superstitiously believe that Mr Ford was the engine, that would stop their science dead. This is the key issue: there is a great difference between God and the gods, and between a God who is the Creator and a god who is the universe. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 51]

- In informal terms, as the British-born American physicist and mathematician Freeman Dyson puts it, 'Gödel proved that in mathematics the whole is always greater than the sum of the parts'. ['The Scientist as Rebel', in *Nature's Imagination – The Frontiers of Scientific Vision*, ed. John Cornwell, Oxford, Oxford University Press, 1995 p. 8.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 53]
- There is more to water than we can readily see by investigating separately the hydrogen and oxygen of which it is composed. There are many composite systems in which understanding the individual parts of the system may well be simply impossible without an understanding of the system as a whole – the living cell, for instance. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 53]
- As the Nobel Prizewinning molecular biologist Francis Crick puts it: The ultimate aim of the modern development in biology is, in fact, to explain all biology in terms of physics and chemistry.' [Of Molecules and Man, Washington, University of Washington Press, 1966, p.10.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 54]
- As Karl Popper points out: 'There is almost always an unresolved residue left by even the most successful attempts at reduction.' ['Scientific Reduction and the Essential Incompleteness of All Science', in *Studies in the Philosophy of Biology, Reduction and Related Problems*, ed. F.J. Ayala and T. Dobzhansky, London, Macmillan 1974.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 54]
- The laws of a higher level cannot be derived from the laws of a lower level – although what can be done at a higher level will, of course, depend on the lower levels. [John C. Lennox: *God's Undertaker: Has Science buried*

God?, Lion Hudson plc 2009, Page 54]

- The British theologian and scientist Arthur Peacocke wrote, ‘In no way can the concept of “information”, the concept of conveying a message, be articulated in terms of the concepts of physics and chemistry, even though the latter can be shown to explain how the molecular machinery (DNA, RNA and protein) operates to carry information...’ [The Experiment of Life, Toronto, University of Toronto Press, 1983, p. 54.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 55]
- those scientists committed to materialistic philosophy insist that the information-carrying properties of DNA must ultimately have emerged automatically out of matter by a mindless, unguided, process. The driving force behind their insistence is obvious. For if, as materialism holds, matter and energy are all that exists. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 56]
- Richard Dawkins: ‘The universe is nothing but a collection of atoms in motion, human beings are simply machines for propagating DNA, and the propagation of DNA is a self-sustaining process. It is every living object’s sole reason for living.’ [BBC Christmas Lectures Study Guide, London, BBC 1991.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 56]
- The universe certainly is a collection of atoms, and human beings do propagate DNA. Both of these statements are statements of science. But immediately we add the words ‘nothing but’, the statements go beyond science and become expressions of materialistic or naturalistic belief. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 56]
- Francis Crick: ‘You, your joys and your sorrows, your memories and ambitions, your sense of personal identity and free will, are in fact no more than the behaviour of a vast assembly of nerve cells and their associated molecules’? [The Astonishing Hypothesis – The Scientific Search for the Soul, London, Simon and Schuster 1994, p. 3.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 56]
- Darwin’s Doubt: ‘With me, the horrid doubt always arises whether the convictions of man’s mind, which has been developed from the mind of the

lower animals, are of any value or at all trustworthy.’ [Charles Darwin, Letter to William Graham, 3 July, 1881.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 57]

- John Polkinghorne describes its programme as ‘ultimately suicidal. If Crick’s thesis is true we could never know it. For, not only does it relegate our experiences of beauty, moral obligation, and religious encounter to the epiphenomenal scrap-heap. It also destroys rationality. Thought is replaced by electro-chemical neural events. Two such events cannot confront each other in rational discourse. They are neither right nor wrong. They simply happen... The very assertions of the reductionist himself are nothing but blips in the neural network of his brain. The world of rational discourse dissolves into the absurd chatter of firing synapses. Quite frankly, that cannot be right and none of us believes it to be so.’ [One World, London, SPCK 1986 p. 92.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 57]

4. Designer universe?

- We are ‘the product of a mindless and purposeless natural process which did not have us in mind’, to quote biologist George Gaylord Simpson. [The Meaning of Evolution, Yale, 1949, p. 344.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 59]
- Physicist Freeman Dyson is one such. He writes: ‘As we look out into the universe and identify the many accidents of physics and astronomy that have worked together to our benefit, it almost seems as if the universe must in some sense have known we were coming.’ [‘Energy in the Universe’, Scientific American, 224, 1971, p. 50.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 59]
- Paul Davies, convinced that we are mere insignificant specks of animated dust. He writes: ‘I cannot believe that our existence in this universe is a mere quirk of fate, an accident of history, an incidental blip in the great cosmic drama. Our involvement is too intimate... We are truly meant to be here.’ [The Mind of God, London, Simon and Schuster, 1992, p. 232.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 59]
- However much we may debate the essence of the scientific method, there is

no question as to the foundation on which that method rests: the rational intelligibility of the universe. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 59]

- It was Albert Einstein's astonishment at this that prompted him to make the famous comment, 'The most incomprehensible thing about the universe is that it is comprehensible.' ('Das Unverstaendliche am Universum ist im Grunde, dass wir es verstehen') [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 59]
- Confidence that our human mental processes possess some degree of reliability and are capable of giving us some information about the world is fundamental to any kind of study, not only the study of science. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 60]
- Philosopher Keith Ward sums up: 'To the majority of those who have reflected deeply and written about the origin and nature of the universe, it has seemed that it points beyond itself to a source which is non-physical and of great intelligence and power. Almost all of the great classical philosophers – certainly Plato, Aristotle, Descartes, Leibniz, Spinoza, Kant, Hegel, Locke, Berkeley – saw the origin of the universe as lying in a transcendent reality. They had different specific ideas of this reality, and different ways of approaching it; but that the universe is not self-explanatory, and that it requires some explanation beyond itself, was something they accepted as fairly obvious.' [God, Chance and Necessity, Oxford, One World Publications, 1996 p. 1.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 60]
- For Albert Einstein the comprehensibility of the universe was something to be wondered at: 'You find it strange that I consider the comprehensibility of the world (to the extent that we are authorized to speak of such a comprehensibility) as a miracle or as an eternal mystery. Well, a priori, one should expect a chaotic world, which cannot be grasped by the mind in any way... the kind of order created by Newton's theory of gravitation, for example, is wholly different. Even if man proposes the axioms of the theory, the success of such a project presupposes a high degree of ordering of the objective world, and this could not be expected a priori. That is the 'miracle'

which is being constantly reinforced as our knowledge expands.’ [Letters to Solovine, New York, Philosophical Library, 1987 p. 131.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 60]

- Eugene Wigner, a Nobel Laureate in Physics, in which he wrote: ‘The enormous usefulness of mathematics in the natural sciences is something bordering on the mysterious, and there is no rational explanation for it... it is an article of faith.’ [E.P. Wigner, ‘The unreasonable effectiveness of mathematics’, Communications in Pure and Applied Mathematics, 13 (1960), pp. 1–14.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 61]
- Professor of Mathematics Sir Roger Penrose FRS, whose understanding of that relationship is unquestioned, has this to say about it: ‘It is hard for me to believe... that such SUPERB theories could have arisen merely by some random natural selection of ideas leaving only the good ones as survivors. The good ones are simply much too good to be the survivors of ideas that have arisen in a random way. There must be, instead, some deep underlying reason for the accord between mathematics and physics.’ [The Emperor’s New Mind, Vintage, 1991 p. 430.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 61]
- John Polkinghorne: ‘Science does not explain the mathematical intelligibility of the physical world, for it is part of science’s founding faith that this is so.’ [Reason and Reality, London, SPCK, 1991, p. 76.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 61]
- faith is inseparable from the scientific endeavour. Gödel’s Second Theorem gives further evidence for this: you cannot even do mathematics without faith in its consistency – and it has to be faith because the consistency of mathematics cannot be proved. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 61]
- Think of Newton’s inverse square law of gravitational attraction. Because we are so familiar with it as an explanation of how the planets orbit the sun in ellipses and use it (or rather, the experts do) to predict all kinds of astronomical events, eclipses and such like, we often fail to realize that there is a hidden faith dimension even here. It is betrayed by our belief that what

happened today will happen again tomorrow. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 61, 62]

- Paul Davies comments: 'Just because the sun has risen every day of your life, there is no guarantee that it will rise tomorrow. The belief that it will – that there are indeed dependable regularities of nature – is an act of faith, but one which is indispensable to the progress of science.' [The Mind of God, op. cit. p. 81.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 62]
- John Haught writes: 'At some point in the validation of every truth claim or hypothesis, a leap of faith is an inescapable ingredient. At the foundation of every human search for understanding and truth, including the scientific search, an ineradicable element of trust is present. If you find yourself doubting what I have just said, it is only because, at this very moment, you trust your own mind enough to express concern about my assertion. You cannot avoid trusting your intellectual capacity, even when you are in doubt. Moreover, you raise your critical questions only because you believe that truth is worth seeking. Faith in this sense, and not in the sense of wild imaginings and wishful thinking, lies at the root of all authentic religion – and science.' [Haught, op. cit., p. 47.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 62]
- Haught rightly concludes that this 'shows clearly that the new atheistic attempts to cleanse human consciousness of faith are absurd and doomed to failure'. [Haught, op. cit. p. 48.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 62]
- Keith Ward strongly supports this view: 'The continuing conformity of physical particles to precise mathematical relationships is something that is much more likely to exist if there is an ordering cosmic mathematician who sets up the correlation in the requisite way. The existence of laws of physics... strongly implies that there is a God who formulates such laws and ensures that the physical realm conforms to them.' [God, Chance and Necessity, Oxford, One World Publications, 1996.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 63]
- Even Stephen Hawking, who occupies the professorial chair once held by Sir Isaac Newton at Cambridge, and who is not known to be particularly

sympathetic to theism, admitted in a television interview: ‘It is difficult to discuss the beginning of the universe without mentioning the concept of God. My work on the origin of the universe is on the borderline between science and religion, but I try to stay on the scientific side of the border. It is quite possible that God acts in ways that cannot be described by scientific laws.’ [ABC Television 20/20, 1989.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 63]

- In his debate on atheism and theism with J. J. C. Smart, J. J. Haldane makes precisely this point, arguing that scientific and religious approaches are similar: ‘Thus science is faith-like in resting upon “creedal” presuppositions, and inasmuch as these relate to the order and intelligibility of the universe they also resemble the content of a theistic conception of the universe as an ordered creation. Furthermore, it seems that the theist carries the scientific impulse further by pressing on with the question of how perceived order is possible, seeking the most fundamental descriptionscum-explanations of the existence and nature of the universe.’ [Atheism and Theism, Oxford, Blackwell, 1996 p. 92.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 63]
- For one of the fundamental problems of philosophy is: Why is there a universe at all, why is there something rather than nothing? [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 63]
- Echoing Bertrand Russell, E. Tryton writes: ‘Our universe is simply one of those things which happen from time to time.’ [‘Is the Universe a Vacuum Fluctuation?’ *Nature* 246, 1973, p. 396.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 64]
- In addition, it would be distinctly odd, as Keith Ward points out, ‘to think that there is a reason for everything, except for that most important item of all – that is, the existence of everything, the universe itself’. [op. cit. p. 23.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 64]
- Peter Atkins believes that ‘Space-time generates its own dust in the process of its own self-assembly.’ [Creation Revisited, Harmondsworth, Penguin, 1994, p. 143.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 64]

- Ward concludes: ‘Between the hypothesis of God and the hypothesis of a cosmic bootstrap, there is no competition. We were always right to think that persons, or universes, who seek to pull themselves up by their own bootstraps are forever doomed to failure.’ [op. cit. p. 49.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 64]
- Stephen Hawking writes: ‘The usual approach of science of constructing a mathematical model cannot answer the questions of why there should be a universe for the model to describe. Why does the universe go to all the bother of existing? Is the unified theory so compelling that it brings about its own existence? Or does it need a Creator, and, if so, does he have any other effect on the universe?’ [op. cit. p. 174.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 64]
- Paul Davies says something similar in an interview: ‘There’s no need to invoke anything supernatural in the origins of the universe or of life. I have never liked the idea of divine tinkering: for me it is much more inspiring to believe that a set of mathematical laws can be so clever as to bring all these things into being.’ [Reported by Clive Cookson, ‘Scientists who glimpsed God’, Financial Times, April 29, 1995, p. 20.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 64]
- It is strange that a scientist of Davies’ standing is prepared to decide how things started on the basis of like or dislike. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 64]
- Furthermore, he is here ascribing intelligence (if not personality) to a set of mathematical laws – and believing that they could be intelligent on the basis that he finds it inspiring! Is this wishful thinking or what? [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 65]
- And, if one dare say so, the much maligned William Paley said as much long ago. Speaking of the person who had just stumbled on a watch on the heath and picked it up he says that such a person would not be ‘less surprised to be informed, that the watch in his hand was nothing more than the result of the laws of metallic nature. It is a perversion of language to assign any law, as the efficient, operative cause of any thing. A law presupposes an agent; for it is only the mode, according to which an agent proceeds: it implies a power;

for it is the order, according to which that power acts. Without this agent, without this power, which are both distinct from itself, the law does nothing; is nothing.’ [William Paley, *Natural Theology*, 1802 op. cit. p. 7.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 65]

- Allan Sandage, widely regarded as one of the fathers of modern astronomy, discoverer of quasars and winner of the Crafoord Prize, astronomy’s equivalent of the Nobel Prize, is in no doubt that the answer to that question is positive: ‘I find it quite improbable that such order came out of chaos. There has to be some organizing principle. God to me is a mystery but is the explanation for the miracle of existence – why there is something rather than nothing.’ [New York Times, 12 March, 1991, p. B9.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 65, 66]
- For, if the universe had no beginning, it is eternal and one might argue that it is simply a brute fact of existence. On the other hand, if it had a beginning, it is not eternal and, therefore, not ultimate. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 66]
- However, long before the ancient Greeks, the Hebrews believed that time was linear and that the universe had a beginning. It had been created, and the Creator was God. This biblical view was held by leading thinkers such as Augustine, Irenaeus and Aquinas. It dominated the intellectual landscape for many centuries. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 66]
- According to him, therefore, creation meant simply that the universe depends on God for its existence. Aquinas thought that it was impossible to tell from philosophical considerations whether the universe was eternal or not: yet he conceded that divine revelation showed that it did indeed have a beginning. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 66]
- Engels made a very perceptive comment on the issues at stake. ‘Did God create the world, or has the world been in existence eternally? The answers which the philosophers gave to this question split them into two great camps. Those who asserted the primacy of the spirit to nature, and therefore, in the last instance, assumed world creation in some form or other... comprised the

camp of idealism. The others, who regarded Nature as primary, belong to the various schools of materialism.’ [Friedrich Engels, Ludwig Feuerbach, New York, International Publishers, 1974, p. 21.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 67]

- Stephen Hawking adopts a similar view: ‘Many people do not like the idea that time has a beginning, probably because it smacks of divine intervention.’ [A Brief History of Time. From the Big Bang to Black Holes, London, Bantam Press, 1988, p. 46.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 67]
- Another well-known scientist who found the idea of a beginning repugnant is Sir John Maddox, a former editor of Nature. He pronounced the idea of a beginning ‘thoroughly unacceptable’, because it implied an ‘ultimate origin of our world’, and gave creationists ‘ample justification’ for their beliefs. [Nature, 340, 1989, p. 425.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 68]
- It is rather ironical that in the sixteenth century some people resisted advances in science because they seemed to threaten belief in God; whereas in the twentieth century scientific ideas of a beginning have been resisted because they threatened to increase the plausibility of belief in God. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 68]
- Hawking admits: ‘In real time, the universe has a beginning and an end at singularities that form a boundary to space–time and at which the laws of science break down.’ [op. cit. p. 139.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 69]
- Charles Townes, who won the Nobel Prize for Physics in 1964 for his discovery of the maser, the forerunner of the laser, writes: ‘In my view, the question of origin seems to be left unanswered if we explore it from a scientific point of view. Thus, I believe there is a need for some religious or metaphysical explanation. I believe in the concept of God and in his existence.’ [Making Waves, American Physical Society, 1995.]
- The remarkable picture that is gradually emerging from modern physics and cosmology is one of a universe whose fundamental forces are amazingly, intricately, and delicately balanced or ‘fine-tuned’ in order for the universe

to be able to sustain life. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 70]

- Again, the ratio of the electromagnetic force-constant to the gravitational force-constant must be equally delicately balanced. Increase it by only 1 part in 1040 and only small stars can exist; decrease it by the same amount and there will only be large stars. You must have both large and small stars in the universe: the large ones produce elements in their thermonuclear furnaces; and it is only the small ones that burn long enough to sustain a planet with life. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 70]
- illustration suggested by astrophysicist Hugh Ross may help. Cover America with coins in a column reaching to the moon (380,000 km or 236,000 miles away), then do the same for a billion other continents of the same size. Paint one coin red and put it somewhere in one of the billion piles. Blindfold a friend and ask her to pick it out. The odds are about 1 in 1040 that she will. [The Creator and the Cosmos, Colorado Springs, Navpress 1995 p. 117.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 71]
- Eminent mathematician Sir Roger Penrose writes: 'Try to imagine the phase space... of the entire universe. Each point in this phase space represents a different possible way that the universe might have started off. We are to picture the Creator, armed with a 'pin' – which is to be placed at some point in the phase space... Each different positioning of the pin provides a different universe. Now the accuracy that is needed for the Creator's aim depends on the entropy of the universe that is thereby created. It would be relatively 'easy' to produce a high entropy universe, since then there would be a large volume of the phase space available for the pin to hit. But in order to start off the universe in a state of low entropy – so that there will indeed be a second law of thermodynamics – the Creator must aim for a much tinier volume of the phase space. How tiny would this region be, in order that a universe closely resembling the one in which we actually live would be the result?' [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 71]
- His calculations lead him to the remarkable conclusion that the 'Creator's

aim' must have been accurate to 1 part in 10 to the power 10¹²³, that is 1 followed by 10¹²³ zeros, a 'number which it would be impossible to write out in the usual decimal way, because even if you were able to put a zero on every particle in the universe there would not even be enough particles to do the job'. [The Emperor's New Mind, Oxford, Oxford University Press, 1989 p. 344.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 71]

- Paul Davies says, 'It seems as though someone has fine-tuned nature's numbers to make the universe... The impression of design is overwhelming.' [The Cosmic Blueprint, New York, Simon and Schuster, 1988, p. 203.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 71]
- We might easily have found ourselves in a part of the universe where we could not see into deep space because of too much starlight; our atmosphere might have been opaque or simply translucent rather than transparent. Others are less obvious: witness the fact that the sizes of the moon and the sun and their distances from the earth are just right that a perfect eclipse is possible. This occurs when the black disc of the moon just barely covers the glowing disc of the sun so that the thin ring of the chromosphere (the 'atmosphere') of the sun is visible and can therefore be investigated scientifically – as a result of which we not only know a great deal more about the sun than we otherwise would, but we were also able to get initial confirmation of the bending of light by gravity predicted by Einstein's theory of general relativity. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 72]
- Their conclusion is this: 'And yet as we stand gazing at the heavens beyond our little oasis, we gaze not into a meaningless abyss but into a wondrous arena commensurate with our capacity for discovery. Perhaps we have been staring past a cosmic signal far more significant than any mere sequence of numbers, a signal revealing a universe so skilfully crafted for life and discovery that it seems to whisper of an extra-terrestrial intelligence immeasurably more vast, more ancient, and more magnificent than anything we've been willing to expect or imagine.' [The Privileged Planet, by Guillermo Gonzalez and Jay W Richards. p. 335.] [John C. Lennox: *God's*

Undertaker: Has Science buried God?, Lion Hudson plc 2009, Page 72, 73]

- Arno Penzias, who used the propitious position of the space-platform of earth to make the brilliant discovery of the ‘echo of the beginning’, the cosmic background microwave radiation, sums up the position as he sees it: ‘Astronomy leads us to a unique event, a universe which was created out of nothing, one with the very delicate balance needed to provide exactly the right conditions required to permit life, and one which has an underlying (one might say ‘supernatural’) plan.’ [Cosmos, Bios and Theos, Margenau and Varghese eds., La Salle, IL., Open Court, 1992, p. 83.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 73]
- All the anthropic principle does is to tell us that for life to exist, certain necessary conditions must be fulfilled. But what it does not tell us is why those necessary conditions are fulfilled, nor how, granted they are fulfilled, life arose. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 73]
- Philosopher John Leslie sees this point. He says that using the anthropic principle against design ‘sounds like arguing that if you faced a firing squad with fifty guns trained on you, you should not be surprised to find that you were alive after they had fired. After all, that is the only outcome you could possibly have observed – if one bullet had hit you, you would be dead. However, you might still feel that there is something which very much needs explanation; namely why did they all miss? Was it by deliberate design? For there is no inconsistency in not being surprised that you do not observe that you are dead, and being surprised to observe that you are still alive.’ [Universes, London, Routledge, 1989, p. 14.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 74]
- John Polkinghorne, for instance, himself an eminent quantum theorist, rejects the many-universe interpretation: ‘Let us recognize these speculations for what they are. They are not physics, but in the strictest sense, metaphysics. There is no purely scientific reason to believe in an ensemble of universes. By construction these other worlds are unknowable by us. A possible explanation of equal intellectual respectability – and to my mind greater economy and elegance – would be that this one world is the way it is, because

it is the creation of the will of a Creator who purposes that it should be so.’ [One World, London, SPCK, 1986 p.80.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 74, 75]

- Philosopher Richard Swinburne goes even further. ‘To postulate a trillion-trillion other universes, rather than one God, in order to explain the orderliness of our universe, seems the height of irrationality.’ [Is There a God? Oxford, Oxford University Press, 1995 p. 68.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 75]
- Cosmologist Edward Harrison reacts in a very similar way. ‘Here is the cosmological proof of the existence of God – the design argument of Paley – updated and refurbished. The fine-tuning of the universe provides prima facie evidence of deistic design. Take your choice: blind chance that requires multitudes of universes, or design that requires only one... Many scientists, when they admit their views, incline towards the teleological or design argument’. [E. Harrison, *Masks of the Universe*, New York, Macmillan, 1985 pp. 252, 263.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 75]
- Arno Penzias puts the argument the other way round: ‘Some people are uncomfortable with the purposefully created world. To come up with things that contradict purpose, they tend to speculate about things they haven’t seen.’ [In Denis Brian, *Genius Talk*, New York, Plenum, 1995.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 75]
- In a similar vein Christian de Duve writes: ‘Even if the theory turns out to be correct, the deduction drawn from it by Rees and Weinberg strikes me as what is called in French “drowning the fish”. Whether you use all the water in the oceans to drown the animal, it will still be there affirming its presence. However, many universes one postulates, ours can never be rendered insignificant by the magnitude of this number... what appears to me as supremely significant is that a combination capable of giving rise to life and mind should exist at all.’ [de Duve, *Life Evolving*, op. cit. p. 299.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 75]
- It is interesting that Martin Rees concedes that the fine-tuning of the universe

is compatible with theism but says he prefers the multiverse theory: ‘If one does not believe in providential design, but still thinks the fine-tuning needs some explanation, there is another perspective – a highly speculative one, so I should reiterate my health warning at this stage. It is the one I much prefer, however, even though in our present state of knowledge any such preference can be no more than a hunch.’ [Our Cosmic Habitat, London: Phoenix, 2003, p. 164.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 75, 76]

- Another version of the multiverse theory, the many worlds interpretation of quantum mechanics, is that every logically possible universe exists. However, if every possible universe exists, then, according to philosopher Alvin Plantinga of Notre Dame University, there must be a universe in which God exists, since his existence is logically possible – even though highly improbable in the view of the New Atheists. It then follows that, since God is omnipotent, he must exist in every universe and hence there is only one universe, this universe, of which he is the Creator and Upholder. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 76]
- Arno Penzias reminds us that the notion that there is a teleological dimension in the universe goes back millennia. He writes: ‘The best data we have (concerning the Big Bang) are exactly what I would have predicted, had I nothing to go on but the five books of Moses, the Psalms and the Bible as a whole.’ [In Malcolm Browne, New York Times, ‘Clues to the Universe’s Origin Expected’, 12 March, 1978 p. 1.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 76]
- For Penzias, as for many other scientists, the majestic words with which Genesis begins have lost none of their relevance or power: ‘In the beginning God created the heavens and the earth.’ It is perhaps not surprising, therefore, that the idea of the Big Bang was first mooted (in Nature in 1931) by a physicist and astronomer, Georges Lemaitre, who was also a priest. [Lemaitre called his original idea the ‘hypothesis of the primeval atom’.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 76]

5 Designer Biosphere?

- Richard Dawkins even defines biology to be ‘the study of complicated things which give the impression of having been designed for a purpose’. [The Blind Watchmaker, Longmans, London, 1986, p. 1.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 79]
- Francis Crick (who won the Nobel Prize jointly with James Watson, for the discovery of the double helix structure of DNA) warns biologists not to mistake that impression for what is, in his estimation, the underlying reality: ‘Biologists must constantly keep in mind that what they see was not designed, but rather evolved.’ [‘Lessons from Biology’, Natural History, vol. 97, 1988, p. 36.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 79]
- Dawkins claims that nothing but the laws of physics are needed: ‘The only watchmaker in nature is the blind forces of physics, albeit deployed in a very special way. A true watchmaker has foresight: he designs his cogs and springs, and plans their interconnections, with a future purpose in his mind’s eye. Natural selection, the blind, unconscious, automatic process which Darwin discovered, and which we now know is the explanation for the existence and apparently purposeful form of all life, has no purpose in mind. It has no mind and no mind’s eye, it does not plan for the future. It has no vision, no foresight, no sight at all. If it can be said to play the role of watchmaker in nature, it is that of the blind watchmaker.’ [The Blind Watchmaker, Longmans, London, 1986, p. 14.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 80]
- Cicero (106–43 bc) extrapolated from his experience of intelligently designed machines to the ordered movement of the planets and stars: ‘... when we see some examples of a mechanism... do we doubt that it is the creation of a conscious intelligence? So when we see the movement of the heavenly bodies... how can we doubt that these too are not only the works of reason but of a reason which is perfect and divine?’ [The Nature of the Gods, translated by H.C.P. McGregor, Penguin, London, 1972, p. 163.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 80]
- William Paley. ‘In crossing a heath, suppose I pitched my foot against a stone,

and were asked how the stone came to be there; I might possibly answer, that, for anything I knew to the contrary, it had lain there forever: nor would it perhaps be very easy to show the absurdity of this answer. But suppose I had found a watch upon the ground, and it should be inquired how the watch happened to be in that place; I should hardly think of the answer which I had before given, that for anything I knew the watch had always been there... The watch must have had a maker: there must have existed... an artificer... who formed it for the purpose which we find it actually to answer; who comprehended its construction and designed its use... Every indication of contrivance, every manifestation of design, which existed in the watch, exists in the works of nature; with the difference, on the side of nature, of being greater or more, and that in a degree which exceeds all computation.’ [Natural Theology; or Evidences of the Existence and Attributes of the Deity, 18th ed. rev., Edinburgh, Lackington, Allen and Co., and James Sawers, 1818, pp. 12–14.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 80, 81]

- Paley: ‘The marks of design are too strong to be got over. Design must have a designer. That designer must have been a person. That person is God.’ [Natural Theology; or Evidences of the Existence and Attributes of the Deity, 18th ed. rev., Edinburgh, Lackington, Allen and Co., and James Sawers, 1818, p. 473.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 81]
- What Paley actually wrote was: ‘It is not necessary that a machine be perfect, in order to show with what design it was made: still less necessary, where the only question is, whether it were made with any design at all.’ [Natural Theology; or Evidences of the Existence and Attributes of the Deity, 18th ed. rev., Edinburgh, Lackington, Allen and Co., and James Sawers, 1818, p. 5.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 82]
- natural theology can, at best, give evidence for the existence of God and say something about a certain limited number of his attributes – his power, for example. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 82]
- In his conclusion he writes: ‘It is a step to have it proved, that there must be

something in the world more than what we see. It is a further step to know, that, amongst the invisible things of nature, there must be an intelligent mind, concerned in its production, order, and support. These points being assured to us by Natural Theology, we may well leave to Revelation the disclosure of many particulars, which our researches cannot reach, respecting either the nature of this Being as the original cause of all things, or his character and designs as a moral governor; and not only so, but the more full confirmation of other particulars, of which, though they do not lie altogether beyond our reasonings and our probabilities, the certainty is by no means equal to the importance. The true theist will be the first to listen to any credible communication of Divine knowledge. Nothing which he has learned from Natural Theology, will diminish his desire of further instruction, or his disposition to receive it with humility and thankfulness. He wishes for light: he rejoices in light. His inward veneration of this great Being, will incline him to attend with the utmost seriousness, not only to all that can be discovered concerning him by researches into nature, but to all that is taught by a revelation, which gives reasonable proof of having proceeded from him.’ [Natural Theology; or Evidences of the Existence and Attributes of the Deity, 18th ed. rev., Edinburgh, Lackington, Allen and Co., and James Sawers, 1818, 542–43.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 82, 83]

- Bertrand Russell, not known for his sympathy to theism, found the design argument logically impressive: ‘This argument contends that, on a survey of the known world, we find things which cannot plausibly be explained as the product of blind natural forces, but are much more reasonably to be regarded as evidences of a beneficent purpose. This argument has no formal logical defect; its premises are empirical and its conclusion professes to be reached in accordance with the usual canons of empirical inference. The question whether it is to be accepted or not turns, therefore, not on general metaphysical questions, but on comparatively detailed considerations.’ [History of Western Philosophy, op. cit. p. 570.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 84]
- An argument that does explain a given effect is always better than one that does not. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 85]

- John Polkinghorne: ‘So where is natural theology today, two centuries after William Paley? The short answer is, “Alive and well, having learned from past experience to lay claim to insight rather than to coerce logical necessity, and to be able to live in a friendly relationship with science, based on complementarity rather than rivalry.”’ [Science and Christian Belief, 2006.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 86]
- Palaeontologist Stephen Jay Gould, a materialist by philosophical conviction, held that after Darwin we know that ‘no intervening spirit watches lovingly over the affairs of nature (though Newton’s clock-winding God might have set up the machinery at the beginning of time and then let it run). No vital forces propel evolutionary change. And whatever we think of God, his existence is not manifest in the products of nature.’ [Darwin’s Legacy, ed. Charles L. Hamrum, New York, Harper & Row Publishers, 1983, p. 6–7.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 86]
- The famous American atheist Robert Green Ingersoll wrote that the nineteenth century would be ‘Darwin’s century’ when ‘his doctrine of evolution... has removed in every thinking mind the last vestige of orthodox Christianity’. [Orthodoxy, 1880.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 86]
- The point was repeated by Sir Julian Huxley when, at the 1959 Darwin Centennial in Chicago, he summed up the implications of evolution as he saw them: ‘In the evolutionary scheme of thought there is no longer either need or room for the supernatural. The earth was not created, it evolved. So did all the animals and plants that inhabit it, including our human selves, mind and soul as well as brain and body. So did religion...’ [Evolution after Darwin, Sol Tax. ed., Chicago, University of Chicago Press, 1960.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 86]
- Take, for example, the following statement from a reputable university textbook on evolution by Monroe Strickberger of the Museum of Vertebrate Zoology, Berkeley, California: ‘The fear that Darwinism was an attempt to displace God in the sphere of creation was therefore justified. To the

question: Is there a divine purpose for the creation of humans? evolution answers No. According to evolution, the adaptations of species and the adaptations of humans come from natural selection and not from design.’ [Evolution, 2nd ed., Sudbury, Jones and Bartlett, 1996 p. 62.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 86]

- Douglas Futuyma agrees: ‘By coupling undirected, purposeless variation to the blind uncaring process of natural selection, Darwin made theological or spiritual explanations of the life processes superfluous. Together with Marx’s materialistic theory of history and society and Freud’s attribution of human behaviour to influences over which we have little control, Darwin’s theory of evolution was a crucial plank in the platform of mechanism and materialism – of much of science, in short – that has been the stage of most Western thought.’ [Evolutionary Biology, 2nd ed. Sunderland MA, Sinauer 1986. p. 3.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 86]
- If life is the result of a purely naturalistic process, what then of morality? Has it, too, evolved? And if so, of what significance are our concepts of right and wrong, justice and truth? [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 88]
- According to William Provine, ‘The destructive assumptions of evolutionary biology extend far beyond the assumptions of organized religion to a much deeper and more pervasive belief held by the vast majority of people, that non-mechanistic organizing designs or forces are somehow responsible for the visible order of the physical universe, biological organisms, and human moral order.’ [Evolution and the Foundation of Ethics, MBL Science, Marine Biological Laboratory, Woods Hole, MS, (3) 1, 25–29.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 88]
- Daniel Dennett thinks that we have not yet really taken on board the implications of evolution and he therefore calls evolution ‘Darwin’s dangerous idea’, because it ‘cuts much deeper into the fabric of our most fundamental beliefs than many of its sophisticated apologists have yet admitted, even to themselves’. [Darwin’s Dangerous Idea, London, Penguin,

1996, p. 18.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 88]

- Dawkins agrees. He has no doubt that, with Darwin, we reach an immensely significant watershed in the history of thought. 'We no longer have to resort to superstition when faced with deep problems: Is there a meaning to life? What are we here for? What is man? After posing the last of these questions, the eminent zoologist G. G. Simpson put it thus: "The point I want to make now is that all attempts to answer that question before 1859 are worthless and that we will be better off if we ignore them completely." ' [The Selfish Gene, Oxford, Oxford University Press, 1976, p. 1.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 88]
- physicist Sir John Houghton: 'The fact that we understand some of the mechanisms of the working of the universe or of living systems does not preclude the existence of a designer, any more than the possession of insight into the processes by which a watch has been put together, however automatic these processes may appear, implies there can be no watchmaker.' [The Search for God – Can Science help? Oxford, Lion Publishing Plc, 1995, p. 54.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 91]
- Richard Swinburne: 'Nature... is a machine-making machine... men make not only machines, but machine-making machines. They may therefore naturally infer from nature which produces animals and plants, to a creator of nature similar to men who make machine-making machines.' [The Existence of God, Oxford, Oxford University Press, 1991, p. 135–36.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 91]
- T.H. Huxley concluded that the doctrine of evolution 'does not even come into contact with Theism, considered as a philosophical doctrine'. [The Academy 1, 1869, 13–14.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 92]
- the theory of evolution demands the existence of a fine-tuned universe producing exactly the right kind of materials and operating according to complex laws. The fine-tuning arguments from chemistry, physics and cosmology are, of course, left unaffected by the biological theory of

evolution. It is therefore surely arguable that the anthropic fruitfulness, both of the fine-tuning of the universe at the physical level and the capacity of its processes to produce organic life by a process of evolution, are, in themselves, strong evidences of a creative intelligence. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 92]

- Stephen Jay Gould wrote: 'Either half of my colleagues are enormously stupid, or else the science of Darwinism is fully compatible with conventional religious beliefs – and equally compatible with atheism.' ['Impeaching a Self-appointed Judge', *Scientific American*, 267, no.1, 1992, 118–21.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 92]
- Alister McGrath points out: 'There is a substantial logical gap between Darwinism and atheism which Dawkins seems to prefer to bridge by rhetoric, rather than evidence.' [Dawkins' God, Oxford, Blackwell, 2005 p. 81.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 93]
- Denis Alexander goes even further in saying that the 'Darwinian theory of evolution, whatever may have been the various ideological uses to which it has been put since 1859, is essentially devoid of either religious or moral significance, and those who try to derive such significance from it are mistaken' [Rebuilding the Matrix, Oxford, Lion Publishing, 2001, p. 291.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 93]
- Stephen Jay Gould says that 'science simply cannot (by its legitimate methods) adjudicate the issue of God's possible existence. We neither affirm it nor deny it; we simply can't comment on it as scientists.' ['Impeaching a Self-appointed Judge', *Scientific American*, 267, no.1, 1992, 118–21.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 93]
- we cannot emphasize too strongly the fact that biological evolution (whatever its extent) requires a fine-tuned universe in which to occur so that no arguments about the nature or status of evolution can undermine the arguments advanced hitherto in this book. [John C. Lennox: *God's*

Undertaker: Has Science buried God?, Lion Hudson plc 2009, Page 93]

- Dennett admits that ‘automatic processes are themselves often creations of great brilliance... we can see that the inventors of the automatic transmission and the automatic door-opener were no idiots, and that their genius lay in seeing how to create something that could do something ‘clever’ without having to think about it’. [Darwin’s Dangerous Idea, London, Penguin, 1996, p. 67.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 94]
- Dennett characterizes this process as ‘mindless, motiveless, mechanicity’. [Darwin’s Dangerous Idea, London, Penguin, 1996, p. 76.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 94]
- Dennett: ‘Love it or hate it, phenomena like this [DNA] exhibit the heart of the power of the Darwinian idea. An impersonal, unreflective, robotic, mindless little scrap of molecular machinery is the ultimate basis of all agency, and hence meaning, and hence consciousness in the universe.’ [Darwin’s Dangerous Idea, London, Penguin, 1996, p. 203.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 94]
- Even doing something as revolutionary as questioning the constancy of the velocity of light provokes nothing like the hurricane that is unleashed against the person who dares to query the validity of certain aspects of the neo-Darwinian synthesis. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 95]
- Dawkins: ‘It is absolutely safe to say that if you meet somebody who claims not to believe in evolution, that person is ignorant, stupid or insane (or wicked, but I’d rather not consider that).’ [‘Put Your Money on Evolution’, The New York Times Review of Books, April 9, 1989, p. 34–35.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 95]
- scientists have dared to question even Newton and Einstein. Indeed, most of us were (rightly – dare I say?) brought up to believe that questioning standard wisdom was one of the most important ways in which science grows. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc

2009, Page 95]

- Lynn Margulis: ‘Like a sugary snack that temporarily satisfies our appetite but deprives us of more nutritious foods, neo-Darwinism sates intellectual curiosity with abstractions bereft of actual details – whether metabolic, biochemical, ecological, or of natural history.’ [Lynn Margulis and Dorian Sagan, *Acquiring Genomes: A Theory of the Origins of Species*, New York, Basic Books, 2002.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 96]
- The questions I shall be raising have to do with whether evolution can carry all the weight put upon it. That it can carry some weight, I do not doubt. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 96]
- Here lies the body of John Lennox. You ask me why he’s in this box? He died of something worse than pox, On Darwinism – heterodox. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 96]
- Phillip Johnson of the University of California, Berkeley, who has done much to stir up debate (and high-level debate at that) on the subject, has pointed out: ‘The danger here is that a methodological premise which is useful for limited purposes has been expanded to form a metaphysical absolute.’ [Objections Sustained, Downers Grove, Illinois, Inter-Varsity Press, 1998, p. 73.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page]
- Donald McKay, an expert in research on the communication networks in the brain, has long since described the way this happened: ‘ “Evolution” began to be invoked in biology, apparently as a substitute for God. And if in biology, why not elsewhere? From standing for a technical hypothesis... the term was rapidly twisted to mean an atheistic metaphysical principle whose invocation could relieve a man of any theological shivers at the spectacle of the universe. Spelt with a capital E and dishonestly decked in the prestige of the scientific theory of evolution (which in fact gave it no shred of justification), “Evolutionism” became the name for a whole antireligious philosophy, in which “Evolution” played the role of a more or less personal deity, as the “real force in the universe”.’ [The Clockwork Image, London,

Inter Varsity Press, 1974, p. 52.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 97]

- Professor D. M. S. Watson would not go so far. According to him, evolution “is accepted by zoologists, not because it is observed to occur or... can be proved by logically coherent evidence to be true, but because the only alternative, special creation, is clearly incredible”. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 97]
- Suppose that naturalism is true. Then, merely as a matter of sheer logical necessity, it follows that some kind of evolutionary account must be given for life, apart altogether from any evidence which may be offered to support it. For, what other possibility can there be? [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 98]
- Galileo ran the risk of questioning Aristotle, and we all know what happened to him. We also know who was right. The question is: Will we learn anything from it? Must Darwin be protected in the same way that Aristotle was? After all, it was a clear fact, was it not, that the earth did not move? [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 99]
- geneticist Richard Lewontin confidently asserts the facthood of evolution: ‘It is time... to state clearly that evolution is fact, not theory... Birds arose from non-birds and humans from nonhumans. No person who pretends to any understanding of the natural world can deny these facts any more than she or he can deny that the earth is round, rotates on its axis and revolves around the sun.’ [Cited by Futuyma in *Science on Trial*, Sunderland MA, Sinauer, 1995, p. 161.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 99]

6 The Nature and Scope of Evolution

- Change, Development, Variation: Here the word is used to describe change, without any implication for the kind of mechanism or intelligent input (or lack of it) involved in bringing about the change. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 101]
- Microevolution: variation within prescribed limits of complexity, quantitative variation of already existing organs or structures: One classic example with which we are, sadly, all too familiar right round the world is the way in which

bacteria develop resistance to antibiotics. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 101]

- Michael Majerus, a Cambridge expert on moths, 'the basic peppered moth story is wrong, inaccurate or incomplete, with respect to most of the story's component parts'. [Melanism – Evolution in Action, Oxford, Oxford University Press, 1998, p. 171.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 102]
- When University of Chicago biologist Jerry Coyne learned of the difficulties with the peppered moth story, he wrote: 'My own reaction resembles the dismay attending my discovery, at the age of six, that it was my father and not Santa who brought the presents on Christmas Eve.' ['Not black and white', Nature 396 (1998), pp. 35–36.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 102]
- Macroevolution: This refers to large-scale innovation, the coming into existence of new organs, structures, body-plans, of qualitatively new genetic material; for example, the evolution of multicellular from single-celled structures. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 102]
- Artificial selection, for example, in plant and animal breeding: Breeders have produced many different kinds of roses and sheep from basic stocks, by very careful selective breeding methods. This process involves a high degree of intelligent input; and so, although often cited, in particular by Darwin himself, who argued that what humans can do in a relatively short time nature could do in a long time, provides in itself no real evidence for evolution by unguided processes. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 102]
- Dobzhansky's view was that, since natural selection needed mutating replicators, it followed clearly that 'prebiological natural selection is a contradiction in terms'. [The Origins of Prebiological Systems and of Their Molecular Matrices, S.W. Fox (ed.), New York, Academic Press, 1965, p. 310.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 102]
- The term 'molecular evolution' is now commonly used to describe the emergence of the living cell from non-living materials. [Evolution by Peter

Skelton (ed.), Addison Wesley, Harlow, England, 1993 p. 854.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 102]

- Natural selection is not creative. As he says, it is a 'weeding out process' that leaves the stronger progeny. The stronger progeny must be already there: it is not produced by natural selection. Indeed, the very word 'selection' ought to alert our attention to this: selection is made from already existing entities. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 104]
- Müller writes: 'Only a few of the processes listed above are addressed by the canonical neo-Darwinian theory, which is chiefly concerned with gene frequencies in populations and with the factors responsible for their variation and fixation. Although, at the phenotypic level, it deals with the modification of existing parts, the theory is intended to explain neither the origin of parts, nor morphological organization, nor innovation. In the neo-Darwinian world the motive factor of morphological change is natural selection, which can account for the modification and loss of parts. But selection has no innovative capacity: it eliminates or maintains what exists. The generative and ordering aspects of morphological evolution are thus absent from evolutionary theory.' [Müller, G.B. 'Homology: The Evolution of Morphological Organization' in Müller G.B. and Newman S.A. (eds.), *Origination of Organismal Form. Beyond the Gene in Developmental and Evolutionary Biology*, Harvard, MIT Press, Vienna Series in Theoretical Biology, 2003, p. 51.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 105]
- Dawkins: 'It is grindingly, creakingly, crashingly obvious that, if Darwinism were really a theory of chance, it couldn't work. You don't need to be a mathematician or a physicist to calculate that an eye or a haemoglobin molecule would take from here to infinity to self-assemble by sheer higgledy-piggledy luck.' [Climbing Mount Improbable, New York, Norton, 1996, p. 67.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 105]
- Paul Wesson. 'Large evolutionary innovations are not well understood. None has ever been observed, and we have no idea whether any may be in progress.'

There is no good fossil record of any.’ [Beyond Natural Selection, Cambridge, MIT Press, 1991 p. 206.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 108]

- A.P. Hendry and M.T. Kinnison put it as follows: ‘Evolution is often considered in two categories: microevolution and macroevolution. The former obviously implies a small amount of change and the latter a large amount. The difficulty comes in deciding where the boundary between the two should fall, whether or not they represent the same processes (acting over different timescales), and whether or not the dichotomy is even useful or valid... Are macroevolutionary events (large morphological changes or speciation) simply the cumulative outcome of microevolutionary mechanisms (micromutation, selection, gene flow, genetic drift) or does macroevolution require some qualitatively different mechanism? The history of this debate is long, convoluted and sometimes acrimonious.’ [A.P. Hendry and M.T. Kinnison, An introduction to microevolution: rate, pattern, process, *Genetica* 112–113, 2001, 1–8.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 108, 109]
- As Goodwin (1995) points out, “the origin of species – Darwin’s problem – remains unsolved” [Resynthesizing Evolutionary and Developmental Biology, *Developmental Biology*, 173, 1996, p. 361.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 109]
- Richard Goldschmidt: “the facts of microevolution do not suffice for an understanding of macroevolution”.’ [The Material Basis of Evolution, Yale University Press 1940, p. 8.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 109]
- John Maynard Smith and E. Szathmary, take a similar line: ‘There is no theoretical reason that would permit us to expect that evolutionary lines would increase in complexity with time; there is also no empirical evidence that this happens.’ [‘The Major Evolutionary Transitions’, *Nature* 374, 1995, p. 227–32.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 109]
- the view of biologist and philosopher Paul Erbrich: ‘The mutation-selection mechanism is an optimization mechanism.’ [Zufall, Stuttgart, Kohlhammer,

1988, p.217, translation mine.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 109]

- More recent work on the E. coli bacterium backs this up. In this research no real innovative changes were observed through 25,000 generations of E. coli bacteria. [D. Papadopoulos et al., Proceedings of the National Academy of Sciences of the USA, 1999 (96), 3807.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 110]
- Biochemist Michael Behe points out that now more than 30,000 generations of E. coli have been studied, equivalent to about a million human years, and the net result is that evolution has produced: 'Mostly devolution. Although some marginal details of some systems have changed during that thirty thousand generations, the bacterium has repeatedly thrown away chunks of its genetic patrimony, including the ability to make some of the building blocks of RNA. Apparently throwing away sophisticated but costly molecular machinery saves the bacterium energy. Nothing of remotely similar elegance has been built. The lesson of E. coli is that it's easier for evolution to break things than to make things.' [The Edge of Evolution: the search for the limits of Darwinism, New York, Free Press, 2007, p. 16.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 110]
- the evidence also shows that there are 'radical limits on the efficacy of random mutation'. [The Edge of Evolution: the search for the limits of Darwinism, New York, Free Press, 2007, p. 13.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 110]
- These studies have yielded unexpected results: '1) Darwinian processes are incoherent and highly constrained. 2) The battle of predator and prey (or parasite and host), which has often been portrayed by Darwinist writers as a productive arms-race cycle of improvements on each side, is in fact a destructive cycle, more like trench-warfare, where conditions deteriorate... 3) Like a staggering, blindfolded drunk who falls after a step or two, when more than a single tiny step is needed for an evolutionary improvement, blind random mutation is very unlikely to find it. And 4) extrapolating from the data on an enormous number of malaria parasites allows us to roughly but confidently estimate the limits of Darwinian evolution for all of life on earth

over the past several billion years.’ [The Edge of Evolution: the search for the limits of Darwinism, New York, Free Press, 2007, p. 19.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 110, 111]

- Ulam argued on the basis of his mathematical calculations that it was highly improbable that the eye could have evolved by numerous small mutational changes since the available time was simply not available. Sir Peter Medawar replied: ‘I think the way that you have treated this is a curious inversion of what would normally be a scientific process of reasoning. It is, indeed, a fact that the eye has evolved; and that, as Waddington says, shows that this [i.e. Ulam’s] formulation is, I think, a mistaken one.’ Biologist Ernst Mayr later commented: ‘So all I am saying is that we have so much variation in all of these things that somehow or other by adjusting these figures we will come out all right. We are comforted by knowing that evolution has occurred.’ [Mathematical Challenges to the Neo-Darwinian Interpretation of Evolution, eds. P.S. Moorhead and M.M. Kaplan, Philadelphia, Wistar Institute Press, 1967 pp. 29, 30] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 112]
- He objected to what he considered to be the too easy acceptance of evolution on the part of the biologists and was challenged by Waddington: ‘Your argument is simply that life must have come about by special creation’ – to which Schützenberger, along with a number of others, cried ‘No.’ Two things are clear from this interchange: firstly that the mathematicians were insisting that their thinking was not motivated by anything other than science; and secondly that the arguments they used were consistent with the view that there was a Creator – at least their biologist colleagues thought so. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 112]
- Astrophysicist and mathematician Sir Fred Hoyle did some calculations that led him also to doubt the validity of extrapolating from micro to macroevolution: ‘As it became clear that the Darwinian theory could not be broadly correct a question still remained, however, for I found it difficult to accept that the theory would be wholly incorrect. When ideas are based on observations, as the Darwinian theory certainly was, it is usual for them to

be valid at least within the range of the observations. It is when extrapolations are made outside the range of observations that troubles may arise. So the issue that presented itself was to determine just how far the theory was valid and exactly why beyond a certain point it became invalid.’ [The Mathematics of Evolution, Weston Publications, Cardiff, University College Cardiff Press, 1987 p. 7] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 112, 113]

- Fred Hoyle’s conclusion to his mathematical arguments is characteristically blunt: ‘Well, as common sense would suggest, the Darwinian theory is correct in the small, but not in the large. Rabbits come from other slightly different rabbits, not from either [primeval] soup or potatoes. Where they come from in the first place is a problem yet to be solved, like much else of a cosmic scale.’ [The Mathematics of Evolution, Weston Publications, Cardiff, University College Cardiff Press, 1987 p. 9] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 113]
- Darwin wrote in *The Origin of Species*: ‘The number of intermediate varieties, which have formerly existed on the earth, [should] be truly enormous. Why then is not every geological formation and every stratum full of such intermediate links? Geology assuredly does not reveal any such graduated organic chain; and this, perhaps is the most obvious and gravest objection which can be urged against my theory.’ [World’s Classics Edition, Oxford, Oxford University Press, 1996, p. 227.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 113]
- Zoologist Mark Ridley comments on the situation: ‘The fossil record of evolutionary change within single evolutionary lineages is very poor. If evolution is true, species originate through changes of ancestral species: one might expect to be able to see this in the fossil record. In fact it can rarely be seen. In 1859 Darwin could not cite a single example.’ [The Problems of Evolution, Oxford, Oxford University Press, 1985, p. 11.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 113]
- Palaeontologist David Raup of the Field Museum of Natural History, which houses one of the largest fossil collections in the world, said: ‘We are now about 120 years after Darwin and the knowledge of the fossil record has been

greatly expanded. We now have a quarter of a million fossil species, but the situation hasn't changed much. The record of evolution is still surprisingly jerky and, ironically, we have even fewer examples of evolutionary transition than we had in Darwin's time.' [Conflicts Between Darwin and Palaeontology, Field Museum of Natural History Bulletin, January 1979, p. 25.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 113, 114]

- Stephen Jay Gould said, 'The extreme rarity of transitional forms in the fossil record persists as the trade secret of palaeontology.' [Evolution's Erratic Pace, Natural History 86, 1977.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 114]
- Niles Eldredge of the American Museum of Natural History, adds: 'When we do see the introduction of evolutionary novelty, it usually shows up with a bang, and often with no firm evidence that the fossils did not evolve elsewhere. Evolution cannot forever be going on somewhere else. Yet that's how the fossil record has struck many a forlorn palaeontologist looking to learn something about evolution.' [Time Frames: The Evolution of Punctuated Equilibria, Princeton, Princeton University Press, 1985, pp. 144–45.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 114]
- Eldredge makes an astonishing admission. 'We palaeontologists have said that the history of life supports [the story of gradual adaptive change] knowing all the while it does not.' [Time Frames: The Evolution of Punctuated Equilibria, Princeton, Princeton University Press, 1985, pp. 144–45.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 114]
- Gould wrote: 'The history of most fossil species includes two features particularly inconsistent with the idea that they gradually evolved: 1. Stasis. Most species exhibit no directional change during their tenure on earth. They appear in the fossil record looking pretty much the same as when they disappear; morphological change is usually limited and directionless. 2. Sudden appearance. In any local area a species does not arise gradually by the steady transformation of its ancestors; it appears all at once and "fully formed".' [See The Episodic Nature of Evolutionary Change in The Panda's

Thumb, New York, W.W. Norton, 1985.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 114]

- Simon Conway Morris, FRS, of Cambridge University, is more tempered in his approach to the Cambrian Explosion than Gould, but nonetheless thinks that such an explosion took place: 'Forms transitional between species can be observed today, and can be inferred to have existed in the past. Nevertheless, the net result is very far from a seamless tapestry of form that would allow an investigator to read the Tree of Life simply by finding the intermediates – living and extinct – that in principle connect all species. On the contrary, biologists are much more impressed by the discreteness of organic form, and the general absence of intermediates.' [The Crucible of Creation, Oxford, Oxford University Press, 1998, p. 4.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 115]
- Niles Eldredge accuses them of being weak on palaeontology. His argument is that the gradualists are concerned to understand how genetic information comes to be modified over the course of time, and then they simply assert that 'evolutionary history is the outcome of natural selection working on available genetic variation'. In other words, they simply extrapolate from what they observe in the present, backwards through geological time. 'And that,' Eldredge continues, 'to my palaeontological eyes is just not good enough. Simple extrapolation does not work. I found that out back in the 60s as I tried in vain to document examples of the kind of slow directional change we all thought ought to be there ever since Darwin told us that natural selection should leave precisely such a tell-tale signal... I found instead that once species appear in the fossil record they tend not to change very much at all. Species remain imperturbably, implacably resistant to change as a matter of course – often for millions of years.' [Reinventing Darwin, New York, Phoenix, 1996, p. 3.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 115]
- Colin Patterson, FRS: 'I will lay it on the line – there is not one such fossil [a fossil which is ancestral or transitional] for which one could make a watertight argument.' [Cited by Pervical Davis and Dean H. Kenyon in *Of Pandas and People*, Dallas, Haughton Publishing Co., 1989, p. 106.] [John

C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 115]

- This is one reason it is important to distinguish conceptually between intermediate forms and transitional forms. An intermediate form is precisely that – a form which could, on the criteria of some given scheme of classification, be placed ‘between’ two entries A and B of that classification, without any necessary implication of whether it had descended from A and was an ancestor of B. An intermediate form would only be transitional if it could be shown to have descended from A and was an ancestor of B. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 116]
- James Valentine in a major study *On the Origin of Phyla* writes: ‘Many of the branches [of the Tree of Life], large as well as small, are cryptogenic (cannot be traced into ancestors). Some of these gaps are surely caused by the incompleteness of the fossil record (chapter 5), but that cannot be the sole reason for the cryptogenic nature of some families, many invertebrate orders, all invertebrate classes, and all metazoan phyla.’ [On the Origin of Phyla, Chicago, University of Chicago Press 2004, p. 35.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 116]
- Paul Chien, J.Y. Chen, C.W. Li and Frederick Leung, ‘SEM Observation of Precambrian Sponge Embryos from Southern China Revealing Ultrastructures including Yolk Granules, Secretion Granules, Cytoskeleton and Nuclei’, Paper presented to North American Paleontological Convention, University of California, Berkeley, June 26–July 1, 2001. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 216, 217]
- Simon Conway Morris, that once animals that have a sufficiently high degree of complexity are in existence, then relatively small genetic changes may trigger fairly large morphological changes. But even here he advises caution: ‘While few doubt that the development of form is underwritten by the genes, at the moment we have almost no idea how form actually emerges from the genetic code.’ [The Crucible of Creation, Oxford, Oxford University Press, 1998, p. 8.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 116]

- Firstly, the claim that the earth orbits the sun is a matter established by observation. That is manifestly not the case for Lewontin’s claim that ‘birds arose out of “non-birds”’ (whatever the latter might have been). That process has never been observed. Secondly, the fact that the earth orbits the sun is not only a matter of observation, it is also a matter of repeated observation. Lewontin’s claim about the origin of birds concerns an unrepeatable, unobserved, past event. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 117]
- It is one thing to say that there is genetic relatedness; it is entirely another to claim that mutation and natural selection are the only mechanisms involved in the production of that relatedness. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 117, 118]
- zoologist Mark Ridley makes an important observation that will be familiar to mathematicians: ‘the simple fact that species can be classified hierarchically into genera, families, and so on, is not an argument for evolution. It is possible to classify any set of objects into a hierarchy, whether their variation is evolutionary or not.’ [New Scientist, 90, 1981, pp. 830–32.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 118]
- Conway Morris concludes that ‘Not only is the universe strangely fit to purpose, but so, too, as I have argued throughout this book, is life’s ability to navigate to its solutions.’ [The Crucible of Creation, Oxford, Oxford University Press, 1998, p. 327.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 118]
- Conway Morris says as much about the phenomenon of evolutionary convergence: ‘Indeed, as our knowledge, especially of biochemistry and protein function, continues to expand, so at least my sense of amazement can only grow. If the watchmaker is blind, he has an unerring way of finding his way around the immense labyrinths of biological space. And even if he doesn’t know where he is going, does He still know? ... Invariably the words tend towards adjectives of stupefaction: astonishing, astounding, remarkable, striking, even uncanny and stunning, are all stock-in-trade responses. As I have pointed out elsewhere, although pronounced by loyal Darwinians, these exclamations seem to reveal a sense of unease. This, I conjecture, is at the

least reflecting a hesitancy as to evolution's having a degree of directionality and, perhaps in the more alert investigator, their worst fears of the re-emergence of a telos.' [The Deep Structure of Biology, Simon Conway Morris Ed., West Conshohocken, Templeton Foundation Press, 2008, p. 46.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 118, 119]

- It is interesting that prominent atheist Thomas Nagel is impressed by such arguments. He notes that evolutionary biologists regularly say that they are confident that random mutations are sufficient to account for the complex chemical systems we observe in living things, yet he feels that there is a great deal of pure rhetoric in their arguments and judges that the evidence is not sufficient to rule out the input of intelligence. [Philosophy & Public Affairs, Wiley Inter Science, Vol. 36, (2), 20, 2008, p. 199.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 120]

7 The Origin of Life

- According to geneticist Michael Denton, the break between the nonliving and the living world 'represents the most dramatic and fundamental of all the discontinuities of nature. Between a living cell and the most highly ordered non-biological systems, such as a crystal or a snowflake, there is a chasm as vast and absolute as it is possible to conceive.' [Evolution – a Theory in Crisis, Bethesda Maryland, Adler & Adler, 1986, p. 249–50.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 122]
- Even the tiniest of bacterial cells, weighing less than a trillionth of a gram, is 'a veritable microminiaturized factory containing thousands of exquisitely designed pieces of intricate molecular machinery, made up altogether of 100 thousand million atoms, far more complicated than any machine built by man and absolutely without parallel in the non-living world'. [Evolution – a Theory in Crisis, Bethesda Maryland, Adler & Adler, 1986, p. 250.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 122]
- according to Denton, there seems to be little evidence of evolution among cells: 'Molecular biology has also shown us that the basic design of the cell system is essentially the same in all living systems on earth from bacteria to

mammals. In all organisms the roles of DNA, mRNA and protein are identical. The meaning of the genetic code is also virtually identical in all cells. The size, structure and component design of the protein synthetic machinery is practically the same in all cells. In terms of their basic biochemical design, therefore, no living system can be thought of as being primitive or ancestral with respect to any other system, nor is there the slightest empirical hint of an evolutionary sequence among all the incredibly diverse cells on earth.’ [Evolution – a Theory in Crisis, Bethesda Maryland, Adler & Adler, 1986, p. 250.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 122, 123]

- Nobel Prize-winner Jacques Monod, whom Denton cites. ‘We have no idea what the structure of a primitive cell might have been. The simplest living system known to us, the bacterial cell... in its overall chemical plan is the same as that of all other living beings. It employs the same genetic code and the same mechanism of translation as do, for example, human cells. Thus the simplest cells available to us for study have nothing “primitive” about them... no vestiges of truly primitive structures are discernible.’ [Chance and Necessity, London, Collins, 1972, p. 134.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 123]
- Bruce Alberts, President of The National Academy of Sciences of the USA: ‘We have always underestimated cells. The entire cell can be viewed as a factory that contains an elaborate network of interlocking assembly lines, each of which is composed of a set of large protein machines... Why do we call the large protein assemblies that underlie cell function, protein machines? Precisely because, like machines invented by humans to deal efficiently with the macroscopic world, these protein assemblies contain highly co-ordinated moving parts.’ [‘The Cell as a Collection of Protein Machines’, Cell 92, 1998, p. 291.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 123]
- The point is repeated by Dawkins in The Blind Watchmaker, who says that if such an organism is found he will ‘cease to believe in Darwinism’. [The Blind Watchmaker p. 91.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 124]
- Behe: ‘molecular evolution is not based on scientific authority. There is no

publication in the scientific literature – in prestigious journals, specialty journals, or books – that describes how molecular evolution of any real, complex, biochemical system either did occur, or even might have occurred. There are assertions that such evolution occurred, but absolutely none is supported by pertinent experiments or calculations... despite comparing sequences and mathematical modelling, molecular evolution has never addressed the question of how complex structures came to be. In effect, the theory of Darwinian molecular evolution has not published, and so it should perish.’ [Darwin’s Black Box, New York, Simon and Schuster, 1996, p. 186.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 124]

- Stephen Jay Gould, who had no known sympathy with Behe’s argument, nonetheless recognized the importance of the concept of irreducible complexity: ‘Classical science, with its preferences for reduction to a few controlling factors of causality, was triumphantly successful for relatively simple systems like planetary motion and the periodic table of the elements. But irreducibly complex systems – that is, most of the interesting phenomena of biology, human society and history – cannot be so explained. We need new philosophies and models, and these must come from a union of the humanities and the sciences as traditionally defined.’ [Review of ‘The Moment of Complexity: Emerging Network Culture’, by Mark C. Taylor in The London Review of Books, vol. 24 no. 4, Feb 22, 2002, p. 5.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 125]
- He argues that the existence of irreducible complexity at the molecular machine level points unmistakably to intelligent design: ‘To a person who does not feel obliged to restrict his search to unintelligent causes, the straightforward conclusion is that many biochemical systems were designed. They were designed not by the laws of nature, not by chance and necessity; rather, they were planned. The designer knew what the systems would look like when they were completed, then took steps to bring the systems about. Life on earth at its most fundamental level, in its most critical components, is the product of intelligent activity.’ [Darwin’s Black Box, New York, Simon and Schuster, 1996, p. 193.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 125]

- For a full list of the amino acids that can be obtained in such experiments, and a detailed discussion of the whole Origin of Life question, see *The Mystery of Life's Origin*, Charles B. Thaxton, Walter L. Bradley and Roger L. Olsen, Lewis and Stanley, Dallas, 1992, p. 38, 73–94 [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 2017]
- Davies says, 'It has been estimated that, left to its own devices, a concentrated solution of amino acids would need a volume of fluid the size of the observable universe, to go against the thermodynamic tide, and create a single small polypeptide spontaneously. Clearly, random molecular shuffling is of little use when the arrow of directionality points the wrong way.' [The Fifth Miracle, London, Allen Lane, Penguin Press, 1998, p. 60.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 127, 128]
- Paul Davies puts it more graphically: 'Making a protein simply by injecting energy is rather like exploding a stick of dynamite under a pile of bricks and expecting it to form a house. You may liberate enough energy to raise the bricks, but without coupling the energy to the bricks in a controlled and ordered way, there is little hope of producing anything other than a chaotic mess.' [The Fifth Miracle, London, Allen Lane, Penguin Press, 1998, p. 61] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 128]
- Organic chemist and molecular biologist A.G. Cairns-Smith puts it this way: 'Blind chance... is very limited... he can produce exceedingly easily the equivalent of letters and small words, but he becomes very quickly incompetent as the amount of organization increases. Very soon indeed long waiting periods and massive material resources become irrelevant.' [The Life Puzzle, Edinburgh, Oliver and Boyd, 1971, p. 95.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 128]
- This is but an updated version of an observation made by Cicero around 46 bc where he cites the Stoic Balbus who saw the immense difficulties associated with the chance-origin of something language-like very clearly: 'If a countless number of copies of the one-and-twenty letters of the alphabet, made of gold or what you will, were thrown together into some receptacle and then shaken out on to the ground, [would it] be possible that they should

produce the Annals of Ennius? I doubt whether chance could possibly succeed in producing a single verse.’ [De Natura Deorum, trans. H. Rackham, Cambridge, MA, Harvard University Press, 1933.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 129]

- Robert Shapiro's conclusion is that: ‘the prebiotic syntheses that have been investigated experimentally almost always lead to the formation of complex mixtures. Proposed polymer replication schemes are unlikely to succeed except with reasonably pure input monomers. No solution of the origin-of-life problem will be possible until the gap between the two kinds of chemistry is closed. Simplification of product mixtures through the self-organization of organic reaction sequences, whether cyclic or not, would help enormously, as would the discovery of very simple replicating polymers. However, solutions offered by supporters of geneticist or metabolist scenarios that are dependent on “if pigs could fly” hypothetical chemistry are unlikely to help.’ [‘The implausibility of metabolic cycles on the prebiotic earth’, PLoS Biology, January 2008, 6 1 e18.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 132]
- Paul Davies puts the difference very clearly: ‘Life is actually not an example of self-organization. Life is in fact specified, i.e. genetically directed, organization. Living things are instructed by the genetic software encoded in their DNA (or RNA). Convection cells form spontaneously by self-organization. There is no gene for a convection cell. The source of order is not encoded in software, it can instead be traced to the boundary conditions in the fluid... In other words, a convection cell’s order is imposed externally, from the system’s environment. By contrast, the order of a living cell derives from internal control... The theory of self-organization as yet gives no clue how the transition is to be made between spontaneous, or self-induced organization – which in even the most elaborate non-biological examples still involves relatively simple structures – and the highly complex, information-based, genetic organization of living things.’ [The Fifth Miracle, op. cit. p. 122.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 132, 133]
- Stephen Meyer puts the issue this way: ‘Self-organizational theorists explain

well what does not need to be explained. What needs explaining is not the origin of order... but the origin of information.’ [The Return of the God Hypothesis, Seattle, Discovery Institute Center for the Renewal of Science and Culture, 1998, p. 37.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 133]

- Leslie Orgel, summed up the position as follows: ‘There are several tenable theories about the origin of organic material on the primitive earth, but in no case is the supporting evidence compelling. Similarly, several alternative scenarios might account for the self-organization of a self-replicating entity from prebiotic organic material, but all of those that are well formulated are based on hypothetical chemical syntheses that are problematic.’ [‘The Origin of Life: A Review of Facts and Speculations’, Trends in Biochemical Sciences, 23 1998, p. 491–500.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 133]
- Orgel therefore echoes the view of Klaus Dose, also a prominent worker in origin of life research, who ten years earlier made the following assessment: ‘More than thirty years of experimentation on the origin of life in the fields of chemical and molecular evolution have led to a better perception of the immensity of the problem of the origin of life on earth rather than to its solution. At present all discussions on principal theories and experiments in the field either end in stalemate or in a confession of ignorance.’ [‘The Origin of life: More Questions than Answers’, Interdisciplinary Science Reviews, 1988, 13, p. 348.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 133]
- Sir Francis Crick, not known to be sympathetic to the miraculous, nevertheless wrote: ‘The origin of life seems almost to be a miracle, so many are the conditions which would have had to have been satisfied to get it going.’ [Life Itself, New York, Simon and Schuster, 1981, p. 88.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 133]
- Stuart Kauffman of the Santa Fe Institute is valid: ‘Anyone who tells you that he or she knows how life started on the earth some 3.45 billion years ago is a fool or a knave. Nobody knows.’ [At Home in the Universe, London, Viking, 1995 p. 31.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 133]

- Francis Collins has said the same: ‘But how did self-replicating organisms arise in the first place? It is fair to say that at the present time we simply do not know. No current hypothesis comes close to explaining how in the space of a mere 150 million years, the prebiotic environment that existed on planet earth gave rise to life. That is not to say that reasonable hypotheses have not been put forward, but their statistical probability of accounting for the development of life still seems remote.’ [The Language of God, op. cit. p. 90.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 133, 134]

8 The Genetic Code and its Origin

- According to Richard Dawkins, ‘What lies at the heart of every living thing is not a fire, warm breath, nor a “spark of life”. It is information, words, instructions... Think of a billion discrete digital characters... If you want to understand life think about digital technology.’ [The Blind Watchmaker, op. cit. p. 112.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 135]
- The nature of their complexity is such that even convinced evolutionary biologists such as John Maynard Smith and Eörs Szathmary confess that: ‘The existing translational machinery is at the same time so complex, so universal, and so essential, that it is hard to see how it could have come into existence, or how life could have existed without it.’ [The Major Transitions in Evolution, Oxford and New York, Freeman, 1995, p.81; see also Nature 374, 227–32, 1995.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 139]
- Nearly ten years later we find microbiologist Carl Woese lamenting that even humans with all their intelligence cannot construct such mechanisms: ‘We don’t understand how to create novelty from scratch – that’s a question for biologists of the future.’ [Cited from Whitfield, ‘Born in a watery commune’, Nature, 427, 674–76.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 139]
- Robert Shapiro, acknowledged expert on DNA chemistry, reminds us that proteins, though they are built following instructions encoded in DNA, are large molecules that chemically are very different from DNA: ‘The above account brings to mind the old riddle: Which came first, the chicken or the

egg? DNA holds the recipe for protein construction. Yet that information cannot be retrieved or copied without the assistance of proteins. Which large molecule appeared first – proteins (the chicken) or DNA (the egg)?’ [‘A simpler origin for life’, *Scientific American*, 25 June 2007, p. 26ff.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 139]

- For this reason geneticist Steve Jones sounds a strong cautionary note: ‘A chimp may share 98 per cent of its DNA with ourselves but it is not 98 per cent human: it is not human at all – it is a chimp. And does the fact that we have genes in common with a mouse, or a banana say anything about human nature? Some claim that genes will tell us what we really are. The idea is absurd.’ [The Language of the Genes, Revised Edition, London, Harper Collins, 2000, p. 35.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 141]
- Barry Commoner, Senior Scientist and Director of the Critical Genetics Project at the Center for the Biology of Natural Systems at Queens College, City University of New York, in his article ‘Unravelling the DNA Myth’ [Harper’s Magazine, February 2002.] lists three discoveries that support the contention that there is more to life than DNA. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 142]
- James Shapiro, who writes: ‘It has been a surprise to learn how thoroughly cells protect themselves against precisely the kinds of accidental genetic change that, according to conventional theory, are the sources of evolutionary variability. By virtue of their proofreading and repair systems, living cells are not the passive victims of the random forces of chemistry and physics. They devote large resources to suppressing random genetic variation and have the capacity to set the level of background localized mutability by adjusting the activity of their repair systems.’ [A Third Way, op. cit. p. 33.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 143]
- Miller and Levine expand on this: ‘The largest stumbling block in bridging the gap between non-living and living still remains. All living cells are controlled by information stored in DNA, which is transcribed in RNA and then made into protein. This is a very complicated system and each of these

three molecules requires the other two – either to put it together or to help it work. DNA, for example, carries information but cannot put that information to use, or even copy itself without the help of RNA and protein.’ [Kenneth R Miller and Joseph Levine, *Biology: The Living Science*, Upper Saddle River NJ, Prentice Hall, 1998 p. 406–407.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 143, 144]

- Leslie Orgel of the Salk Institute for Biological Studies: ‘There is no agreement on the extent to which metabolism could develop independently of a genetic material. In my opinion, there is no basis in known chemistry for the belief that long sequences of reactions can organize spontaneously – and every reason to believe they cannot. The problem of achieving sufficient specificity, whether in aqueous solution or on the surface of a mineral, is so severe that the chance of closing a cycle of reactions as complex as the reverse citric acid cycle, for example, is negligible.’ [‘The origin of life – a review of facts and speculations’, *Trends in Biochemical Sciences*, 23, 1998, 491–95.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 144]
- In his book *Gödel, Escher, Bach – an Eternal Golden Braid* mathematician Douglas Hofstadter writes: ‘A natural and fundamental question to ask on learning of these incredibly, intricately interlocking pieces of software and hardware is: “How did they ever get started in the first place?”... from simple molecules to entire cells, is almost beyond one’s power to imagine. There are various theories on the origin of life. They all run aground on this most central of central questions: “How did the Genetic Code, along with the mechanisms for its translation, originate?” ’ [an *Eternal Golden Braid*, London, Penguin, 1979, p. 548.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 145]
- Werner Loewenstein, who has won world renown for his discoveries in cell communication and biological information transfer, says: ‘This genetic lexicon goes back a long, long way. Not an iota seems to have changed over two billion years; all living beings on earth, from bacteria to humans, use the same sixty-four word code.’ [The *Touchstone of Life*, London, Penguin Books, 2000 p. 64.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 145, 146]

- Michael Polanyi explains the implication of this: ‘Suppose that the actual structure of the DNA molecule were due to the fact that the bindings of its bases were much stronger than the bindings would be for any other distribution of bases, then such a DNA molecule would have no information content. Its code-like character would be effaced by an overwhelming redundancy... Whatever may be the origin of a DNA configuration, it can function as a code only if its order is not due to the forces of potential energy. It must be as physically indeterminate as the sequence of words is on a printed page.’ [‘Life’s Irreducible Structure’, *Science*, 160, 1968, p. 1309.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 146]
- Hubert Yockey, author of the influential text *Information Theory and Biology*, confirms this judgement: ‘Attempts to relate the idea of order... with biological organization or specificity must be regarded as a play on words which cannot stand careful scrutiny. Informational macromolecules can code genetic messages and therefore carry information because the sequence of bases or residues is affected very little, if at all, by physicochemical factors.’ [H. Yockey, ‘A Calculation of the Probability of Spontaneous Biogenesis by Information Theory’, *J. Theor. Biology* 67, 1977, 377–98.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 146]

9 Matters of Information

- So measuring syntactic information is very important and the theory associated with it is called the Shannon Theory of Information, after Claude Shannon who developed it and proved certain mathematical results about the capacity of a noisy channel that are the foundation of the theory of communication upon which our society depends today. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 151]
- The word ‘algorithm’ derives from the name of the mathematician Mohammed Ibn-Musa Al-Khwarizmi, who worked in the famous House of Wisdom in Baghdad in the ninth century. An algorithm is an effective procedure, a way of getting something done in a finite number of steps. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc

2009, Page 153]

- This term specified complexity was first used by Leslie Orgel in his book *The Origins of Life* and also by Paul Davies in *The Fifth Miracle*, but in neither place is it made precise. It has been investigated in a thoroughgoing fashion by mathematician William Dembski in *The Design Inference: Eliminating Chance through Small Probabilities*. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 154]
- Davies appears to contradict what he has just said by adding: 'The problem as far as biogenesis is concerned is that Darwinism can only operate when life (of some sort) is already going. It cannot explain how life starts in the first place' [The Fifth Miracle, pp. 21–22.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 157]
- we record a warning by an expert on the origin of life, Nobel Laureate physicist Robert Laughlin, whose research is on those properties of matter that make life possible (and who is not an advocate of intelligent design): 'Much of present day biological knowledge is ideological. A key symptom of ideological thinking is the explanation that has no implications and cannot be tested. I call such logical dead ends anti-theories because they have exactly the opposite effect of real theories: they stop thinking rather than stimulate it. Evolution by natural selection, for instance, which Darwin conceived as a great theory has lately come to function as an anti-theory called upon to cover up embarrassing experimental shortcomings and legitimize findings that are at best questionable and at worst not even wrong. Your protein defies the laws of mass action – evolution did it! Your complicated mess of chemical reactions turns into a chicken – evolution! The human brain works on logical principles no computer can emulate? Evolution is the cause!' [A Different Universe: Reinventing Physics from the Bottom Down, New York, Basic Books, 2005 p. 168–69.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 158]
- After all, if we went to Mars and discovered a long sequence of piles of titanium cubes receding towards the Martian horizon where the piles each consisted of a prime number of cubes and the piles were in the correct ascending order 1,2,3,5,7,11,13,17,19, ... then we would surely immediately

conclude that this arrangement involved an intelligent input even if we had no idea whatsoever of the nature of the intelligence behind it. But if we discovered something much more complex – say a DNA molecule – then naturalistic scientists would presumably conclude that it was a result of chance and necessity! [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 159]

- Leonard Brillouin, in his classic work on information theory, has no doubt where the answer lies. He says that ‘A machine does not create any new information, but it performs a very valuable transformation of known information.’ [Science and Information Theory, 2nd Ed. New York, Academic Press, 1962.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 160]
- Twenty years later, no less a scientist than Nobel Laureate Peter Medawar wrote: ‘No process of logical reasoning – no mere act of mind or computer-programmable operation – can enlarge the information content of the axioms and premises or observation statements from which it proceeds.’ [‘Limits of Science’, op. cit. p. 79.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 160]
- Gödel’s own formulation (in the third person) runs as follows: ‘More generally, Gödel believes that mechanism in biology is a prejudice of our time which will be disproved. In this case, one disproof, in Gödel’s opinion, will consist in a mathematical theorem to the effect that the formation within geological times of a human body by the laws of physics (or any other laws of a similar nature), starting from a random distribution of the elementary particles and the field, is as unlikely as the separation by chance of the atmosphere into its components.’ [See Hao Wang’s article in Nature’s Imagination – The Frontiers of Scientific Vision, Ed. John Cornwell, Oxford, Oxford University Press, 1995, p. 173.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 161]
- Leading origin of life researcher Bernd-Olaf Küppers deduces from it the following interesting consequence: ‘In sequences that carry semantic information the information is clearly coded irreducibly in the sense that it is not further compressible. Therefore there do not exist any algorithms that generate meaningful sequences where those algorithms are shorter than the

sequences they generate.’ [‘Der Semantische Aspekt von Information und seine Evolutions biologische Bedeutung’, Nova Acta Leopoldina, NF 72, Nr. 294, 195–219, 1996.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 161]

10 The Monkey Machine

- Russell Grigg, in his article ‘Could Monkeys Type the 23rd Psalm?’, calculates that if a monkey types one key at random per second, the average time to produce the word ‘the’ is 34.72 hours. To produce something as long as the 23rd Psalm (a short Hebrew poem made up of 603 letters, verse numbers and spaces) would take on average around 10^{1017} years. The current estimate of the age of the universe lies somewhere between four and fifteen times 10^9 years. [Interchange 50, 1993, pp. 25–31.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 164]
- Sir Fred Hoyle and astrophysicist Chandra Wickramasinghe share Dawkins’ view – on the capabilities of pure chance processes, that is. ‘No matter how large the environment one considers, life cannot have had a random beginning. Troops of monkeys thundering away at random on typewriters could not produce the works of Shakespeare, for the practical reason that the whole observable universe is not large enough to contain the necessary monkey hordes, the necessary typewriters and certainly not the waste paper baskets required for the deposition of wrong attempts. The same is true for living material. The likelihood of the spontaneous formation of life from inanimate matter is one to a number with 40,000 noughts after it... It is big enough to bury Darwin and the whole theory of evolution. There was no primeval soup, neither on this planet nor on any other, and if the beginnings of life were not random, they must therefore have been the product of purposeful intelligence.’ [Evolution From Space, Simon and Schuster, New York, 1984, p. 176. See also the last chapter of their book, Cosmic Life Force, Dent, London, 1988.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 164, 165]
- Nobel Prize-winning physicist, Brian Josephson of Cambridge, points out another hidden assumption in Dawkins’ attempt to climb his mountain: ‘In such books as The Blind Watchmaker, a crucial part of the argument concerns whether there exists a continuous path, leading from the origins of

life to man, each step of which is both favoured by natural selection, and small enough to have happened by chance. It appears to be presented as a matter of logical necessity that such a path exists, but actually there is no such logical necessity; rather, commonly made assumptions in evolution require the existence of such a path.’ [‘Letter to the Editor’, *The Independent*, London, January 12, 1997.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 165]

- mathematician David Berlinski in a much-discussed article rather trenchantly comments: ‘The entire exercise is... an achievement in self-deception. A target phrase? Iterations which resemble the target? A computer or Head monkey that measures the distance between failure and success? If things are sightless how is the target represented, and how is the distance between randomly generated phrases and the targets assessed? And by whom? And the Head Monkey? What of him? The mechanism of deliberate design, purged by Darwinian theory on the level of the organism, has reappeared in the description of natural selection itself, a vivid example of what Freud meant by the return of the repressed.’ [‘The Deniable Darwin’, *Commentary*, June, 1996, pp. 19–29.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 168]
- To quote Berlinski again: ‘The Darwinian mechanism neither anticipates nor remembers. It gives no directions and makes no choices. What is unacceptable in evolutionary theory, what is strictly forbidden, is the appearance of a force with the power to survey time, a force that conserves a point or a property because it will be useful [like the ratchet in the watch]. Such a force is no longer Darwinian. How would a blind force know such a thing? And by what means could future usefulness be transmitted to the present?’ [‘The Deniable Darwin’, *Commentary*, June, 1996, pp. 19–29.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 169]
- Philosopher Keith Ward’s comment is highly apposite: ‘Dawkins’ strategy for reducing amazement and incredibility just does not work. It just shifts the surprise from the spontaneous generation of a complex and highly desired result to the spontaneous existence of an efficient rule which is bound to produce the desired result in time.’ [God, Chance and Necessity, Oxford, One

World Publications, 1996, p 108.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 171, 172]

- Computer scientist Robert Berwick comments that ‘all our experience with simulated evolution – from Dawkins’ biomorph programmes where he offered prizes to those who could figure out ways to actively select for interesting organism shapes, all the way to the sorry experiences with artificial life that Berlinski notes – demonstrates how hard it is to get anywhere without doing artificial selection or building in the solutions we want’. [Robert Berwick, ‘Respond’, The Boston Review, Feb/March 1995, p. 37.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 172]
- Phillip Johnson has captured this fundamental problem very neatly: ‘It takes more human intelligence to programme the computer to generate ‘methinksitislikeaweasel’ from a random letter selection programme, than it does just to hit the print key and print the target phrase from the computer’s memory where you wrote it in the first place.’ [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 172]
- Steve Fuller captures the idea very well: ‘the very prospect of simulating evolution on a computer to the satisfaction of someone like Kauffman already bolsters the case for a divine creator. After all, any such computer program is, strictly speaking, a product of intelligent design, not literally a self-organizing entity surviving at the edge of chaos. If humans can program a computer that generates an output with such deep selforganizing properties, why couldn’t God? In short, the status of intelligent design as an alternative explanation for the emergence of life is likely to become more heated as evolutionists rely increasingly on computers to demonstrate that natural history is not merely complicated but genuinely complex. This is simply because the two positions will become harder to distinguish from each other, and the evolutionists will be playing on the intelligent design theorists’ turf. The alternative, of course, would be for evolutionists to demonstrate the existence of a von Neumann machine in the wild that bears no signs of design, human or otherwise.’ [Steve Fuller, *Science Vs. Religion*, Cambridge, Polity, 2007 p.89.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 173]

11 The Origin of Information

- Stephen Meyer: ‘DNA does not imply the need for an intelligent designer because it has some similarities to a software programme or to a human language. It implies the need for an intelligent designer because... it possesses an identical feature (namely, information content) that intelligently designed human texts and computer languages possess.’ [The Return of the God Hypothesis, Seattle, Discovery Institute Center for the Renewal of Science and Culture, 1998, p. 23.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 174]
- Meyer is supported by information theorist Hubert Yockey. ‘It is important to understand that we are not reasoning by analogy. The sequence hypothesis (that the genetic code works essentially like a book) applies directly to the protein and the genetic text as well as to written language and therefore the treatment is mathematically identical.’ [‘Self-Organization, Origin of Life Scenarios and Information Theory’, Journal of Theor. Biol. 91, 1981, p. 13–31.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 174, 175]
- The astronomer Carl Sagan thought that a single message from space would be enough to convince us that there were intelligences in the universe other than our own. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 175]
- At the public announcement of the completion of the Human Genome Project, its director Francis Collins said: ‘It is humbling for me and awe-inspiring to realize that we have caught the first glimpse of our own instruction book, previously known only to God.’ [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 176]
- Gene Myers, the computer scientist who worked on the genome mapping at the Maryland headquarters of Celera Genomics, said: ‘We’re deliciously complex at the molecular level... We don’t understand ourselves yet, which is cool. There’s still a metaphysical, magical element... What really astounds me is the architecture of life... the system is extremely complex. It’s like it was designed... There’s a huge intelligence there. I don’t see that as being unscientific. Others may, but not me.’ [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 176]

- Observational cosmologist Allan Sandage, whom we mentioned earlier, discussing his conversion to Christianity at the age of 50, said: ‘The world is too complicated in all its parts and interconnections to be due to chance alone. I am convinced that the existence of life with all its order in each of its organisms is simply too well put together’. [‘A Scientist Reflects on Religious Belief’, Truth 1, 1985, p. 54.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 176]
- philosopher Anthony Flew gave as the reason for his conversion to theism after over 50 years of atheism that biologists’ investigation of DNA ‘has shown, by the almost unbelievable complexity of the arrangements which are needed to produce life, that intelligence must have been involved’. [Associated Press Report, December 9, 2004.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 176]
- A suggestion along these very lines has been made in an editorial in the New Scientist in which Paul Davies writes: ‘The increasing application of the information concept to nature has prompted a curious conjecture. Normally we think of the world as composed of simple, clod-like, material particles, and information as a derived phenomenon attached to special, organized states of matter. But maybe it is the other way around: perhaps the universe is really a frolic of primal information, and material objects a complex secondary manifestation.’ [30 January, 1999, p. 3.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 177]
- Yet information is not only invisible: it is immaterial, is it not? You are reading this book; photons bounce off the book and are received by your eye, converted into electrical impulses and transmitted to your brain. Suppose you pass on some information from this book to a friend by word of mouth. The sound waves carry the information from your mouth to your friend’s ear, from where they are converted into electrical impulses and transmitted into his brain. Your friend now has the information that originated in your mind, but nothing material has passed from you to your friend. The carriers of the information have been material, but the information itself is not material. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 178]
- Richard Dawkins: ‘To explain the origin of the DNA/protein machine by

invoking a supernatural Designer is to explain precisely nothing, for it leaves unexplained the origin of the Designer. You have to say something like “God was always there” and if you allow yourself that kind of lazy way out, you might as well just say “DNA was always there”, or “Life was always there”, and be done with it.’ [The Blind Watchmaker, op. cit. p. 141.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 178, 179]

- Dawkins appears to believe that the only kind of explanation that is worthy of the name ‘scientific’ is an explanation that proceeds from the simple to the complex. His express desire is to explain everything in terms of the ‘simple things that physicists understand’. (I am well aware of the view in philosophical theology that God is ‘simple’ but I do not refer to this view here since, in normal discussion, mind is usually regarded as more ‘complex’ than matter, although admittedly it is hard to pin down precisely what that means.) [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 179]
- Again, atoms are simpler than living creatures since living creatures are complex structures made up of atoms. On the other hand, atoms are far from simple, which is one of the reasons elementary particle physics continues to attract some of the most powerful intellects on earth. The deeper down you probe into the ultimate nature of the structure of the universe, the more complex it becomes. The ‘simple things that physicists understand’ are not so simple after all. Think of relativity, quantum mechanics or, better still, quantum electrodynamics. They are so far from being simple that only the most intelligent human minds can grasp them and even then there are many mysteries still unresolved. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 179]
- If we were to receive (as featured in Carl Sagan’s novel Contact) a signal consisting of a sequence of prime numbers, we would assume it was coming from an intelligent source. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 181]
- As we remarked, even Dawkins appears (in the film Expelled) to have moved his ground towards admitting that design is something that, in principle, could be recognized by science. [John C. Lennox: *God’s Undertaker: Has*

Science buried God?, Lion Hudson plc 2009, Page 181]

- We should also note in this context that Dawkins seems to be impressed by the multiverse hypothesis and yet he realizes there is a problem: ‘it is tempting to think (and many have succumbed) that to postulate a plethora of universes is a profligate luxury which should not be allowed. If we are going to permit the extravagance of a multiverse, we might as well be hung for a sheep as a lamb and allow a God.’ [The God Delusion, op. cit. p. 169ff.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 181]
- We are trying to explain one particular example of organized complexity (life) and it is therefore perfectly sensible to do that in terms of something that is more complex, if that is what is demanded by the evidence. The evidence, as we have seen, is that: 1. Life involves a complex DNA database of digital information. 2. The only source we know of such language-like complexity is intelligence. 3. Theoretical-computer science indicates that unguided chance and necessity are incapable of producing semiotic (language-like) complexity. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 182]
- The Greeks taught that: 1. Matter has always existed and always will. It is eternal. In its basic state it was formless, unorganized and boundless – chaos. But then some god or other arose and imposed order on this pre-existent material, and turned it into a well ordered universe – cosmos. This process is what the Greeks meant by creation. 2. The creator is part of an eternal system in which everything in the universe emanates out of God, like sunbeams out of the sun; and so, in some sense, everything is God. God is somehow in the matter of the universe, actively engaged in moving and developing matter to the best effect. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 183, 184]
- The ancient Hebrew tradition, inherited by Christianity and Islam, is very different and, we might note, it had been around for centuries before the time of the Ionian philosophers. It taught that: 1. Matter is not eternal: the universe had a beginning, and there is only one eternal God and Creator of all. 2. God existed before the universe, and is independent of it. The universe is not an emanation out of God. God created it out of nothing, not out of himself,

though he maintains it and is guiding it to its destined goal. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 184]

- Dawkins expresses the hope that physicists will ‘complete Einstein’s dream and discover the final theory of everything. I am optimistic that although the theory of everything will bring physics to a convincing closure, the enterprise of physics will continue to flourish, just as biology went on growing after Darwin solved its deep problem. I am optimistic that the two theories together will furnish a totally naturalistic explanation for the existence of the universe and everything that’s in it, including ourselves.’ [Contribution to online magazine Edge.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 185]
- Stephen Hawking, who for years also dreamed of such a final theory, admitted in 2004 that Gödel had put paid to them: ‘Some people will be very disappointed if there is not an ultimate theory that can be formulated as a finite number of principles. I used to belong to that camp, but I have changed my mind. I’m now glad that our search for understanding will never come to an end, and that we will always have the challenge of new discovery. Without it, we would stagnate. Gödel’s theorem ensured there would always be a job for mathematicians. I think M theory will do the same for physicists.’ [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 186]
- Austin Farrar writes: ‘An endless quest for explanation has been praised as a divine discontent. In fact, it is a propensity most characteristic of rudimentary minds. “Why does that man wear that hat?” “Because he is a policeman.” “Why is he a policeman?” “Because he wanted to be one when he grew up.” “Why did he want to be one?” “Because he wanted to earn his living.” “Why did he want to earn his living?” “So as to be able to live – everyone does.” “Why does everyone want to live?” “Stop saying ‘Why?’ darling, and go to sleep.” Yes. Some time we must stop saying “Why?” because we have reached the fact that is senseless to question; for example, it is useless to ask why living beings want to live. ... The issue between the atheist and the believer is not whether it makes sense to question ultimate fact, it is rather the question: what fact is ultimate? The atheist’s ultimate fact is the universe;

the theist's ultimate fact is God.' [Farrer, *A Science of God*, op. cit. p. 33–34.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 186]

- Biologist James Shapiro asks the question: 'What significance does an emerging interface between biology and information science hold for thinking about evolution? It opens up the possibility of addressing scientifically rather than ideologically the central issue so hotly contested by fundamentalists on both sides of the Creationist-Darwinist debate. Is there any guiding intelligence at work in the origin of species displaying exquisite adaptations that range from lambda prophage repression and the Krebs cycle through the mitotic apparatus and the eye to the immune system, mimicry and social organization?' ['A Third Way', *Boston Review*, Feb/ March 1997 p. 33.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 187]
- Biophysicist Dean Kenyon, co-author of a definitive textbook on the origin of life, says the more that has been learned in recent years about the chemical details of life, from molecular biology and origin-of-life studies, the less likely does a strictly naturalistic explanation of origins become. Kenyon's studies have led him to the conclusion that biological information has been designed: 'If science is based on experience, then science tells us that the message encoded in DNA must have originated from an intelligent cause. What kind of intelligent agent was it? On its own, science cannot answer this question; it must leave it to religion and philosophy. But that should not prevent science from acknowledging evidences for an intelligent cause origin wherever they may exist.' [Of Pandas and People: The Central Question of Biological Origins, P. Davis and D.H Kenyon, Dallas, Texas, Haughton Publishing Co., 1989, p. 7.] [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 187]
- It is therefore surprising to read, from the pen of someone as eminent as E.O. Wilson, the following denial of the existence of such evidence: 'Any researcher who can prove the existence of intelligent design within the accepted framework of science will make history and achieve eternal fame. He will prove at last that science and religious dogma are compatible! Even a combined Nobel Prize and Templeton Prize (the latter designed to

encourage search for just such harmony) would fall short of proper recognition. Every scientist would like to accomplish such an epoch-making advance. But no one has even come close, because unfortunately there is no evidence, no theory and no criteria for proof that even marginally might pass for science. There is only the residue of hoped-for default, which steadily shrinks as the science of biology expands.’ [‘Intelligent Evolution’, Harvard Magazine, November 2005.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 187]

- Allan Sandage, who is widely regarded as the greatest living cosmologist: ‘The world is too complicated in all its parts and interconnections to be due to chance alone. I am convinced that the existence of life with all its order in each of its organisms is simply too well put together.’ [‘A Scientist Reflects on Christian Belief’, Truth 1, 1985, p. 54.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 188]
- Plantinga sums up: ‘Could we not sensibly conclude, for example, that God created life, or human life, or something else specially? (I do not say we should conclude that: I only suggest that we could, and should if that is what the evidence most strongly suggests).’ [‘Should Methodological Naturalism Constrain Science’ in Christian Perspectives for the New Millenium, Scott B Luley, Paul Copan and Stan W Wallace, Eds., Addison Texas, CLM/RZIM Publ., 2003] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page]
- But they are of great importance as we can see by listing what we suggest they are: the origin of the universe, its rational intelligibility, its fine-tuning, the origin of life, the origin of consciousness, the origin of rationality and the concept of truth, the origins of morality and spirituality. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 190]

12 Violating nature? The legacy of David Hume

- We conclude that there are two major reasons why Hume’s view of miracles is deeply flawed: 1. Since he denies that the uniformity of nature can be established, he cannot turn round and use it to disprove miracle. 2. Since he denies necessary causation, he cannot regard nature as described by laws embodying necessary relationships which would preclude miracle. [John C.

Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 198]

- Newton's Law of Gravitation tells me that if I drop an apple it will fall towards the centre of the earth. But that law does not prevent someone intervening, and catching the apple as it descends. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 200]
- Thus, from the theistic perspective, the laws of nature predict what is bound to happen if God does not intervene; though, of course, it is no act of theft if the Creator intervenes in his own creation. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 201]
- If miracles were normal, they wouldn't be called miracles! What, then, does Hume mean by 'uniform experience'? It is one thing to say, 'Experience shows that such and such normally happens, but there may be exceptions, although none has been observed; that is, the experience we have had, has been uniform.' It is an entirely different thing to say, 'This is what we normally experience, and we must always experience it, for there can be and are no exceptions.' [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 201, 202]
- What Hume does is to assume what he wants to prove, namely that there have never been any miracles in the past, and so there is uniform experience against this present instance being a miracle. But here his argument runs into very serious trouble. How does he know? In order to know that experience against miracles is absolutely uniform, he would need to have total access to every event in the universe at all times and places, which is, self-evidently, impossible. It would seem that Hume has forgotten that humans have only ever observed a tiny fraction of the sum total of events that have occurred in the universe. He has also forgotten that, in any case, very few of the total of all human observations have ever been written down. Therefore, Hume cannot know that miracles have never occurred. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 202]
- The only real alternative to Hume's circular argument, of course, is to be open to the possibility that miracles have occurred. That is a historical question, not a philosophical one, and it depends on witness and evidence. [John C. Lennox: *God's Undertaker: Has Science buried God?*, Lion Hudson plc

2009, Page 202]

- Hume notes that ‘a wise man proportions his belief to the evidence’. [Miracles, op. cit. p. 73.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 203]
- Ironically enough, it is surely arguable that it is only belief in a Creator that gives us a satisfactory ground for believing in the uniformity of nature in the first place. In denying that there is a Creator, the atheists are kicking away the basis of their own position. [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 205]

Epilogue: Beyond Science but not beyond Reason

- Arthur Schawlow who won the Nobel Prize for his work on laser spectroscopy. He said: ‘We are fortunate to have the Bible and especially the New Testament, which tells us so much about God in widely accessible human terms.’ [Cited by Margenau, Henry, and Roy Varghese, *Cosmos, Bios, Theos*, La Salle, IL, Open Court Publishing, 1992, p. 107.] [John C. Lennox: *God’s Undertaker: Has Science buried God?*, Lion Hudson plc 2009, Page 210]

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