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Misusing Darwin: The Materialist Conspiracy in Evolutionary Biology

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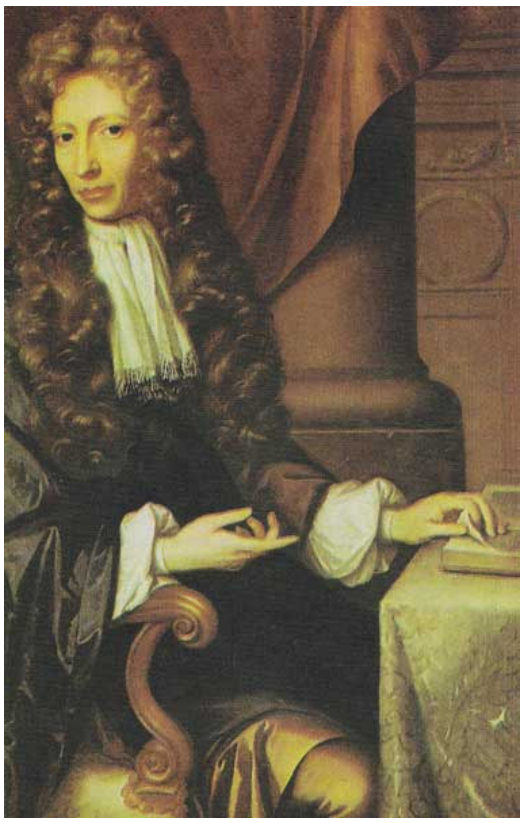

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With a Response by The Revd Dr John Polkinghorne KBE FRS
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Keith Ward is Emeritus Regius Professor of Divinity in the University of Cambridge and Former Professor of Divinity at Gresham College London. He has held lecturer posts in logic at the University of Glasgow, in philosophy at St Andrew's, and in philosophy of religion at King's College, London. He was Fellow, Dean and Director of Studies in philosophy and in theology at Trinity Hall, Cambridge, where he was also lecturer in divinity. He was the F.D. Maurice Professor of Moral and Social Theology at the University of London, where he was also Professor and Head of the Department of History and Philosophy of Religion. Among other degrees, Professor Ward holds a DD from both Oxford and Cambridge.

A priest in the Church of England, Keith Ward was (1991-2003) Regius Professor of Divinity at Oxford and a Canon of Christ Church. He is a Fellow of the British Academy, an Honorary Fellow of Trinity Hall, Cambridge and of the University of Wales. He is a member of the Governing Council of the Royal Institute of Philosophy, and a member of the editorial boards of *Religious Studies*, *Journal of Contemporary Religion*, *Studies in Inter-Religious Dialogue*, and *World Faiths Encounter*. He has been a Visiting Professor at Drake University, Iowa, at Claremont Graduate School, California and at the University of Tulsa, Oklahoma. He has published extensively: his most recent book is *Why There Almost Certainly Is A God - Doubting Dawkins* (2008).

Responder --- The Revd Dr John Polkinghorne KBE FRS

A Fellow of the Royal Society and also a Fellow (and former President) of Queens' College, Cambridge, Dr Polkinghorne's career as a physicist began at Trinity College, Cambridge. He received his BA in 1952 (MA in 1956), was elected a Fellow of Trinity in 1954, and gained his PhD in 1955. In 1956 he was appointed a lecturer in mathematical physics at Edinburgh: returning to Cambridge as a lecturer in 1958, he was promoted to reader in 1965 and professor in 1968. In 1974 he was elected FRS and awarded the ScD by Cambridge. During this time he published many papers on theoretical elementary particle physics in learned journals and technical scientific books.

In 1979 John Polkinghorne resigned his Professorship to train for the Anglican priesthood, studying at Westcott House. He was ordained deacon in 1981 and served as curate in Cambridge (St Andrew's, Chesterton 1981-82) and Bristol (St Michael and All Angels, Bedminster 1982-84) and was Vicar of Blean (near Canterbury) from 1984-86. He was Canon Theologian of Liverpool Cathedral 1994-

2005. He was appointed an honorary professor of physics at the University of Kent in 1984. In 1986 he was appointed Fellow, Dean and Chaplain at Trinity Hall, Cambridge, and in 1989 he was appointed President of Queens' College, from which he retired in 1996. He was made KBE in 1997. He was awarded the Templeton Prize for Science and Religion in 2002 and also in that year became the Founding President of the International Society for Science and Religion. He is an Honorary Fellow of St Chad's College, Durham, St Edmund's College, and Trinity Hall, Cambridge. He has published extensively: his most recent book is *Theology in the Context of Science* (2008).

Misusing Darwin: The Materialist Conspiracy in Evolutionary Biology

Keith Ward

Science and Materialism

'We take the side of science...because we have a prior commitment, a commitment to materialism...moreover, that materialism is absolute, for we cannot allow a Divine Foot in the door'.

Sometimes people can be more embarrassed by their friends than by their enemies. It is surely embarrassing for science to be defended on the grounds that it is founded on an absolute prior commitment to a highly disputed and deeply problematic philosophical view. If ever there was a dogmatic, unquestioning faith that zooms well beyond the evidence, this is it.

Who could say such a thing? It was Richard Lewontin, a highly respected Harvard professor and evolutionary naturalist. Admittedly he said it in the New York Review of Books in 1997, but even so he presumably meant it.

He is not alone in thinking that evolutionary biology is often driven by a prior commitment to materialism. Francis Crick is on record as saying - again in a newspaper, the Daily Telegraph of March 20, 2003 - that it was his distaste for religion that largely motivated his search for a purely chemical basis for life. Once again the dislike of divine feet drives the search for mechanical causes, and nothing but mechanical causes, of all events in the cosmos.

A lead article in the science journal 'Nature', in June, 2007, contained this sentence: 'With all deference to the sensibilities of religious people, the idea that man was created in the image of God can surely be put aside'. It went on to suggest that 'scientific theories of human nature' are necessarily in conflict with out-dated religious views – with all deference, of course, to the millions of out-dated people in the world. If the scientific account is accepted, the suggestion is, it is no longer possible to hold that there is something special about humans that gives them a particular function or form of conscious relationship to a God.

The same journal, in an editorial published in the issue of July 19, 1984, declared that all supernatural causes were absolutely ruled out by science – so that miracles, for examples, were shown to be impossible by science.

Why is the possibility of divine causality so disliked and even dogmatically denied? One reason can be found in a major article called 'Evolution: the Ultimate Guide' in the New Scientist for 19 April, 2008. The writer, Michael le Page, says, 'The genomes of complex creatures reveal a lack of any intelligence or foresight...the inescapable conclusion is

that if life was designed, the designer was lazy, stupid and cruel'. He goes on to say that humans are far from being perfect finished products. Humans are rather 'a crude early prototype thrown up by a desperately cruel process'.

In a new book about Darwin, philosopher A.C.Grayling writes, 'Biological 'design' is manifestly not the outcome of previous planning and execution by an intelligent purposive agency, unless that agency is markedly incompetent or markedly malevolent' (Darwin; for the love of science, p. 232).

Evolution is a lazy, stupid, cruel, malevolent, unintelligent, wholly accidental process. One leading evolutionary biologist assured me that the word 'purpose' is a red rag to a biologist, and would have to be avoided at all costs if you hoped to be published in a peer-reviewed journal of biology. Another told me that he (or she) would not publicly discuss his belief in God lest it should compromise his biological reputation, and make people suspect that he (or she) was prejudiced. The admission of atheism, of course, is not prejudiced, and it enables biologists to be purely and relentlessly scientific, without any bias whatsoever.

So there is not even a door into which a divine foot could be wedged. Evolution is a long series of accidents and mistakes, and it is not going anywhere. The suggestion is that evolutionary biology shows the development of life on earth to be the result of innumerable copying errors in the replication of DNA and RNA, of a number of chance cosmic collisions and meteorite impacts which nearly destroyed all life on earth more than once, but enabled small mammals to become dominant on this planet, and of basic laws of thermodynamics which ensure that the whole thing will one day run down and cease to be. Humans are here by chance and accident, and we will probably not be here for long. There is no place for God or purpose in such a universe.

Different Kinds of Explanation

The argument can seem strong, especially when it is backed by the authority of leading biologists. But we need to ask whether explanation in terms of pure chance is good evidence for materialism, or whether it is rather a forced and one-sided consequence of having adopted a materialist view in the first place.

There is clearly a strong anti-religious bias to much evolutionary biology. And yet a number of highly competent biologists have been religious believers – Theodosius Dobzhansky, Carolus Linnaeus, Gregor Mendel, and Alfred Russell Wallace among them. Ronald Fisher, Sewall Wright, Simon Conway Morris, Francis Collins, Alister Hardy, Warren Weaver, Francisco Ayala, and Kenneth Miller are modern evolutionary biologists who have espoused various forms of belief in God. So it cannot be quite obvious that evolutionary biology is committed to materialism.

The materialist presupposition often extends beyond biology, even beyond science, to the humanities in general. Art, literature, and music are little more than matters of

personal preference, anthropology and sociology are little better than gossip, morality is a matter of how you decide to act, history is largely a vehicle for expressing political prejudices, and economics is continually challenged by the unpredictable (that is, random) decisions of human beings.

E. O. Wilson, in his book 'Consilience', explicitly proposes a programme of reducing all the humanities to rigorous science, expunging the remaining references to consciousness, value, and purpose, and replacing them by physical explanations in terms of past evolutionarily successful strategies. All real facts are scientific facts, and all values are subjective expressions of taste without objective ontological status or causal efficacy.

Many of the best-known leaders of the scientific establishment, especially in evolutionary biology, are committed to a programme to propagate a reductionist, materialist worldview under the guise of 'proper science'. In fact, however, materialism and reductionism are philosophical theories that are in no way entailed by the practice of evolutionary biology.

A.C.Grayling expresses what seems to be a wide consensus among scientists that Darwinism is a competing theory of explanation with theism. They are explanations of the same sort, but theism is obsolete, and has been effectively replaced by Darwinism.

What this shows is a refusal to make proper distinctions between philosophy, religion, and science. There are many sorts of scientific explanation, but a paradigmatic form of scientific explanation seeks to explain the behavior of physical objects in terms of general mathematically expressible laws which generate predictions that can be confirmed or falsified by experimentally controllable observations.

Philosophy does not do that. Philosophy has no equations, predictions, experiments, or conclusive confirmations – that is precisely why some of us become philosophers in the first place. Philosophy asks about the meaning of the terms we use, the grounds for human knowledge-claims, and the different sorts of things we talk about and refer to. Thus a philosopher might ask whether scientific explanation is the only sort of explanation there is. Could there be other sorts of explanation, not appealing to mathematical laws, not generating precise predictions, and not concerned with experimental control?

An example might be historical explanation, in terms of the motives and desires of human agents. Such explanation may refer to general behavior patterns, to common human desires and intentions. But it may always remain disputable, imprecise (mathematically speaking), and concerned with events that are unrepeatable in principle. Philosophers argue about the nature of scientific and historical explanation. In such arguments, they will not carry out experiments or construct equations, though they will appeal to various sorts of human experience and their interpretations, and they will seek some sort of fit between what happens and their interpretation of it.

There is a concern with confirmation and with evidence, but it is not the sort of precise, measurable, controllable thing physicists deal with.

Just as there is historical explanation, so there is religious explanation – much more like historical than like scientific explanation. Believers in God do not seek precise mathematically expressible predictions (when they do, they are always wrong, which shows that they too have got science and religion mixed up). They do not, if they are sensible, seek to experiment on God or observe God under controlled conditions. Primarily, they worship God, entering into a quasi-personal relation to a spiritual or non-physical reality that is expressed in some way in the physical universe.

Does God explain the universe or anything in it? Theists think that God does explain the universe, in the sense of providing a reason why the universe exists – in order, for instance to generate intelligent agents who can be co-operative companions of the creator. This is an explanation, but it assigns no laws and makes no predictions about what precisely God might do. It is an axiological explanation, in terms of values for the sake of which the universe exists. The explanation is concerned with confirmation and evidence, but – rather like history – the evidence will be disputable, often ambiguous, and never conclusively decidable beyond all reasonable doubt.

Typically, religious believers do not come to believe because they think they have a better scientific explanation of the world than atheists. They may feel a sense of awe, reverence, and gratitude at the wonder of nature; they may feel a sense of personal inadequacy or ineffectiveness or ennui; they may begin to search for something that will give meaning and a sense of value and freedom to their lives.

The four noble truths of Buddhism put it very well: human experience has the nature of un-ease; we can become aware that such unease is caused by grasping desire; we may look for release from such grasping; and we may find it in a path of self-discipline and attention to an ideal of objective goodness, in moral commitment and meditation.

Religious belief often begins with a sense of personal inadequacy, a dream of a moral ideal, and a desire for personal liberation from hatred, greed and ignorance. That is perhaps why it arouses such great passions in modern atheists – because it touches the roots of human self-understanding, the refusal to accept inadequacy, the rebellion against any objective spiritual value.

Religion begins in such personal reactions and responses to the world, not in attempts to explain its physical structure. Religion, in short, seeks axiological explanation, and it is grounded in existential self-understanding. Modern materialism does not accept the possibility of axiological explanation – all explanations must be non-purposive, just in terms of general and impersonal laws. Modern materialism sees existential self-understanding as mere subjective Narcissism, and insists that all true understanding must lie in a dispassionate experimental publicly verifiable attitude to the world. It is not

surprising, then, that materialists systematically misunderstand religion. They do not even see what it is about.

Understanding Religion

When Grayling says 'it is certain that one common feature of early religion was that it served as a form of proto-science', and gives as an example that thunder was once seen as a god walking on the clouds, he has missed the point as completely as it is possible to do.

In fact nothing is certain about early religion, as the Oxford anthropologist Edward Evans-Pritchard delightfully points out in his classic book, 'Theories of Primitive Religion' (Oxford, Clarendon Press, 1965). What sort of magic insight do people like Grayling have that enables them to know, without any evidence, that early humans thought gods walked on the clouds? Professional scholars of the history of religions might have hoped that the impossibility of knowing what early humans, long before the development of written language, thought, would prevent anyone from ever claiming certainty again about the unrecoverable beliefs of Neolithic humans. But it was not to be!

No doubt there were early attempts to explain the occurrence of thunder, though we have no idea of what they were. But why should anyone think that such attempts formed part of 'religion'? Anthropologists are wary of attempts to separate out religion as a distinct identifiable aspect of early cultural life. But it seems likely there were rituals, ceremonial burials, and festivals centred on hunting or agriculture. By the time we get to the first written accounts of something we might call proto-religion, in Babylonia, we find cultic rituals of sacrifice to gods, and it is in acts of sacrifice and prayer that we may find the first historically ascertainable beginnings of religion.

It is only by heroic special pleading that we would call sacrifice and prayer 'proto-scientific'. Such activities, after all, still exist, and it seems fairly evident that singing hymns, genuflecting before holy objects, and fasting or meditating (as an atheist might see it, sitting around trying to think about nothing) are not the sorts of things that scientists do in their professional capacities. Religious activities seem not to be concerned with what Oxford philosopher Peter Strawson (in an influential British Academy lecture, 'Freedom and Resentment') called 'objective attitudes' such as observing objects closely, without emotion, experimenting on them to see what happens, and recording the results. Religious acts are more concerned with 'reactive attitudes', involving some sort of self-discipline intended to establish a positive relation to quasi-personal and non-physical (spiritual) entities, or their material symbols.

You may not believe there are any spiritual entities. But most religious believers do, and their belief is not a scientific, or even a proto-scientific one. Why hold, with no evidence, that early humans sacrificed in order to encourage a god not to walk on the clouds, when that is not how any contemporary religious believer would describe their

cultic activities? The sacrifice of the Mass, for example, expresses worship of a spiritual entity of supreme beauty, confession of one's own moral failures, prayer for forgiveness, for reconciliation with God, and for the well-being of others for whom you are concerned. It expresses an inner personal and self-changing relation to a reality of supreme value. To see it as a bribe to get a god to do what you want is to pervert what believers think (though it is not beyond some adherents of religion to pervert it for themselves). And why could that not be what religious believers have always thought, though they have clothed their inner concerns in many diverse material symbols and imaginative forms?

The crucial question therefore is whether there a spiritual reality of supreme value, to which humans might consciously relate. This is not the place to answer that question. What is relevant is that this is not a question of whether a god is needed to explain various puzzling events like thunder. No god is needed for that. Grayling supposes that the chief *raison d'etre* for hypothesizing the existence of God is to explain why various physical events occur. Then, once a natural explanation is found, God becomes superfluous. But if religious activity is distinct from scientific activity today, why could it not have been so in proto-human times? And why, anyway, should what proto-humans did and thought help to explain what religion is today, any more than a study of Babylonian astrology can help to explain what astronomy is today?

Basic Ontological Commitments

This determination not to understand the nature of a religious explanation is deeply puzzling. Suppose I said that Plato's idea of the Good was an attempt to explain why thunder occurred. I hope you would say that I had made a category mistake. I had mistaken an ultimate ontological postulate for a specific scientific explanation. Plato is saying, among other things, that moral truths are objective, and that this world of appearances is founded on a deeper spiritual and intelligible reality. If he is wrong, his mistake is not a mistake in physics or chemistry. It is hard to see that it should properly be called a mistake at all. It is a commitment to the ontological priority of intelligible and moral truth.

Such is the basic commitment of most major religions. They add to it specific ways of consciously relating to that ultimate truth and of understanding it partly in terms of symbols taken from the physical world. But the relation of such a postulate and commitment to the basic postulates and methods of scientific explanations, with their preference for mathematical laws describing physically observable regularities under controlled conditions, is very indirect.

An example of a basic ontological commitment is the assertion that physical laws exist. A contrary commitment is that they do not objectively exist, but are simply descriptions of observed regularities. There are such competing commitments in many areas of human thought. Religion is, or presumes, an ontological commitment to the priority of mind and value. That commitment is disputed. But whatever the religious ontological

commitment is, it does not entail a factual belief that fairies, or gods (presumably made of very thin matter), walk on the clouds. It is not an empirically testable dispute. But it is a dispute. Such disputes are resolved (or at least clarified) by argument, not by experiment. The arguments appeal to coherence, consistency, simplicity, compatibility with well-established knowledge, fruitfulness, elegance and comprehensiveness. Most traditional philosophers have called such disputes philosophical. It is a strange age in which even philosophers cannot remember what philosophy used to be about – and what many of us think it is still about.

Idealism and Materialism

One of the great philosophical disputes is that of idealism (generically, that mind is ontologically prior to matter) versus materialism. Materialist biologists do not usually pause to consider the arguments that many philosophers, and almost all the great classical philosophers, have brought against materialism. In the modern scientific world it is easy to forget what a paradoxical, controversial, and fragile philosophical theory materialism actually is. It is difficult to give a rigorous and comprehensive definition of materialism, but on the whole materialists believe that everything that exists has a place in space and time, that everything is made of material elements, and that there is nothing else that really exists, nothing non-spatial or non-temporal or non-material (they like to call such things 'supernatural', trying to link them with ghosts, séances, and the paranormal, so as to discredit their intellectual ancestry).

Hard materialists think that this is a necessary truth. Nothing could exist that is not locatable in space-time. It is impossible, however, to think of any reason why this should be a necessary truth - especially since materialists often deny that there are any necessary truths. It is certainly not self-contradictory to say that some reality exists beyond space-time. Indeed, most modern cosmologists talk about this space-time originating by quantum fluctuations in a vacuum. Whatever that is, it is beyond space-time, as are the other six or seven dimensions posited by M-theory, for example. For that reason some materialists prefer the term 'naturalism'. But it still seems unjustifiable to deny that there are or could be any entities or realities that do not fall under the definition of naturalism, whatever naturalism is. Such dogmatism seems wholly out of place to any reasonably open-minded person.

It is more reasonable to espouse contingent or soft materialism, which concedes that there might be non-material realities, but says that as a matter of fact there are none. Such universal negatives are virtually impossible to establish, so perhaps we might modify it further to say that at least we have no positive evidence that there are non-material objects.

What could such evidence consist of? If by definition we confine evidence to the evidence of the senses, and if we define the senses as giving nothing but immediate apprehension of spatio-temporal particulars, then there could be no possible evidence for the existence of non-material objects.

The irony of this position is that, as some British empiricist philosophers argued, including at least one of my own philosophy teachers, there could be no possible evidence for the existence of objectively existing material objects either. Modern science knows that material objects when unperceived by us are nothing like the objects of our immediate experience, the contents of our sensory consciousness.

John Locke pointed out that our phenomenal awareness of colour, of redness, blueness and so on, is not an awareness of objects that possess those very properties. What exists apart from our perceptual consciousness is a set of electromagnetic waves, comprising a small section of the electromagnetic spectrum, to which the cones of human eyes are sensitive. Quantum mechanics generalises this point, to show that our awareness of objects as solid three-dimensional and discretely located entities, is not an apprehension of objects as they exist unobserved. Unobserved electrons may be probability waves in Hilbert space; but they are observed, in experimental conditions, as locatable points on a surface.

The lesson is clear: what we are immediately conscious of is not the world as it actually is apart from human consciousness. We see the world as it appears to us with our organs of perception and our form of consciousness. It is not immediate experience, it is thought and reflection, that demonstrates that the world as appearance to human consciousness is not the world as it is in itself.

Materialism, therefore, is not based on the direct evidence of the senses. On the contrary, in its modern forms it seems hugely counter-intuitive. If the materialist view is that we live in a curved space-time of eleven dimensions, this contradicts all common-sense beliefs which are based on immediate consciousness. It is based on argument, not immediate and unreflective experience.

There certainly is an overwhelming body of evidence for quantum theory, and sense-experience is not irrelevant to it. But it would be totally misleading to say that it is directly based on sense-experiences that are available to any human being. If you put me in the Large Hadron Collider outside Geneva and asked me to find a Higgs Boson, I would not know where to start. I would guess that I would be looking for a pattern of squiggly lines on a computer-generated diagram, but whether they would be due to a Higgs Boson or a disappearing Cheshire Cat (probably belonging to Schrodinger) I would have no way of knowing.

There is no question that physical theories have to be testable by experiment, though in some cases, as with string theory, for example, it may be very difficult even to think of experiments that would be conclusive. Without a sophisticated theory to guide our observations we would have no hope of understanding modern physics. Such theories largely derive, these days, from complex mathematical models, and the interpretation of the mathematics – what in reality corresponds to its values and variables, in detail,

may be mysterious, paradoxical, or perhaps even irrelevant - all views that quantum physicists have propounded.

Evidence, in fundamental physics, is not a matter of just looking and seeing, not even of looking very closely and recording observations minutely. It is often a matter of devising a mathematical model that will produce predictable observations under closely controlled conditions that have been artificially constructed precisely with the aid of the model itself.

This presupposes that the cosmos is intelligible, mathematically structured, and that the human mind can comprehend such structures by intellectual effort, coupled with carefully devised experimental observation. Ironically, therefore, scientifically informed materialism is committed to a strict form of supernaturalism. If the 'natural' is all that exists in space-time, then whatever exists beyond space-time, beyond the publicly observable, is supernatural. Yet scientific materialism postulates a supremely elegant and intelligible mathematically structured realm from which many space-times may and possibly do arise, and which is knowable by the creative activity of the intellect, not directly, much less solely, through the senses.

Materialism, then, is much more akin to supernaturalist theism than it is to common-sense empiricism (the belief that the real world is just the one our senses reveal to us, just as they perceive it). The evidence for a supernatural reality is that the natural realm apprehended by our human senses is revealed by scientific investigation, and by the nature of scientific method, to be only an appearance of a mathematically describable reality - a supernatural reality - beyond it.

The Supernatural

I would expect many scientists to be shocked by this statement. That is because they systematically confuse the 'supernatural' with the 'superstitious'. They think that religious people postulate the existence of things like fairies, ghosts, whimsical and unreasonable causes of events, and violations of physical laws. It is not by accident that materialist philosophers like Daniel Dennett refer to a 'sky-god' who lowers 'sky-hooks' to pull things along from time to time, thereby arbitrarily violating physical laws. The rhetoric of parody and ridicule is a major weapon in the materialist armoury - for if God is thought of as made of very thin matter, living in the sky, the God postulate becomes a scientific postulate, and a very bad one at that.

But any half-competent theologian knows that, whereas fairies and ghosts are material entities, only made of very thin, diaphonous matter, God is not material at all, and has no location in space-time - rather like the quantum vacuum from which all space-times originate. Moreover, if there is a God, God is wise or reasonable, not whimsical and subject to arbitrary impulses. Thus God is more likely to create a universe of intelligible law than one of unpredictable surprises (as Isaac Newton realised, and thereby virtually invented the idea of mathematically expressible 'laws of nature'). As for the phrase

'violation of physical law', it is due to one of philosophy's most notable atheists, David Hume, and cannot be found anywhere in the Bible or in the works of the classical Christian theologians. If there are miracles, they are events not wholly explicable by laws of physics, but disclosive of a deeper non-physical reality. It is not at all absurd to think there may be such events. Indeed, it seems sheer dogmatic presumption to think that all events whatsoever, everywhere in the cosmos, must fall under some regular law of physics. My own view is that this dogma is almost certainly false, but whether false or true, as a dogmatic postulate it seems no less extreme or weird than the postulate that there is an ultimate cosmic mind which has created the laws of nature, and is capable of acting in ways that the laws of nature alone do not fully explain.

Materialist biologists do not usually pay close attention to theological tradition. If they did, they would see that the supernatural of which Christians speak is a wholly intelligible realm accessible, to some extent, by the human intellect, a realm which underlies and in some sense accounts for the natural realm that we observe with our senses. This is no male person in the sky, letting down skyhooks to help earthly evolution along by arbitrary and relatively rare interferences. It is an intelligible reality, unperceivable by the senses, beyond space-time, of which the whole natural cosmos is an appearance to finite intellects.

So far considered, God belongs to the same type of being as the quantum vacuum, which is also an intelligible reality, unperceivable by the senses, beyond space-time, from which space-time originates, and of which the world we see and feel is an appearance. It is therefore wholly mistaken to say, as Nigel Franks does in an otherwise wonderful article about ant intelligence in 'The Deep Structure of Biology', that 'science has nothing to say directly about worldviews that postulate the supernatural' (p. 124). It is precisely science at its most materialist that postulates a supernatural basis of the natural world.

Yes, but this scientific supernatural has no purpose, no intelligence, no consciousness. It has no concern with values or with meaning. It just happens to be there by chance, grinding out universes without thought or foresight. It is not God. This, of course, points to the central distinction between materialism and its major contrasting philosophical view, which I will call generic idealism. By generic idealism I mean the rather large set of views that consciousness is a basic and irreducible element of reality, and that it is the source of the physical cosmos. Consciousness does not emerge from the physical, as some sort of unexpected and unpredictable new sort of reality. The physical emerges from consciousness, as an expression or appearance of its nature and purpose.

This is not a scientific view, any more than materialism is. Contemporary science, at least in physics and biology, does not concern itself with consciousness. It considers the purely physical nature of things, usually seeking mathematically expressible laws of regular succession in accordance with which physical events occur.

Suppose that the supernatural origin of our space-time has the nature of consciousness. We might then postulate that a logical space of all possible states of affairs exists as an eternal (supratemporal) object of knowledge, within a unitary consciousness.

There are problems with this idea of a complete set of all possible states. We may prefer to think, as many philosophers have done, that a supra-temporal consciousness would contain, not every possible state, but a set of generic archetypes – types of state rather than every individual state. In either case, these states could be evaluated as desirable or undesirable (good or bad) in various ways, and the cosmic mind could intend to realise some set of desirable states. Our space-time could originate through an intention to actualise a set of values that could only come to exist within our space-time.

For this scenario, there would be foresight, value, and purpose involved in the origin of space-time. The postulate is elegant and simple, since there is just one basic reality (the cosmic mind) from which all things originate, and they do so for one basic reason (for the sake of the unique sorts of goodness the cosmos actualises). Moreover, the logical space of possibilities could not be other than it is (since the set of all possible states, or types of state, is exhaustive and admits of no alternatives).

So the cosmic mind has the sort of necessity that many physicists desire in any final theory of the cosmos. It contains and contemplates all possible states. In such states there is no change, no succession, no actual pain or happiness. But the contemplation of them is itself blissful, comprising one unrestricted act of complete understanding. If goodness lies in the perfect comprehension of that which is intrinsically worth-while, then God is supremely good, surveying all possibilities with passionless attention. There is no evil when there is no actual pain, frustration or destruction. But there is the good of the apprehension of every possible form of beauty and integrated complexity. So God is wholly good, without pain, frustration, or destruction.

Such a God would have the sort of value that provides the best possible reason for its own existence (that reason being that it is supremely worthy of existence). There is also good reason for the actual existence of entities in time, which realize the possibility of creative change, action, and relationship. New and distinctive sorts of goodness arise, as the potentialities of temporal and plural beings unfold and develop. For such a view, there is no ultimate chance or accident about the existence of the cosmos. It is founded on necessity and goodness, the two ultimate foundations of the rationality and beauty of being.

There could nevertheless be an important place for chance in such a rational cosmos. Chance, or incomplete determination by the supreme being, may be a condition of the development of genuine creative and moral agency in created entities (as John Polkinghorne suggests in his notion of a 'free process defence' of the goodness of God. See 'Science and Providence', Templeton Foundation, 2005, pps. 77-8). But this would

be a restricted sort of chance – an indeterminacy that exists within a general process directed to the existence of conscious intelligent beings.

The Elegant Efficiency of Evolution

If this were true, what could we expect of the cosmos? We would expect to see in it an intelligible and efficient process that realises many sorts of distinctive values. Is that what we do see? Materialists sometimes concede that is how it seems. First, as to the efficiency of the process: 'The complexity of living organisms is matched by the elegant efficiency of their apparent design', says Richard Dawkins (The Blind Watchmaker, Penguin, 1986, p. xiii). Again, 'We animals are the most complicated and perfectly designed pieces of machinery in the known universe' (The Selfish Gene, Penguin, 1976, p. xi).

These comments are hardly compatible with saying that the process of evolution is the product of blind chance, or that it is lazy or incompetent. Elegant efficiency is hardly a matter of luck. It seems like design - though Professor Dawkins argues that this is only apparent, not real design. This is a very long way from the 'New Scientist' claim that any designer of evolution would be lazy and stupid. On the contrary, the process appears to be elegant, efficient, and well organised.

Proponents of blind chance rarely follow through on just how blind chance would be. The philosopher David Hume was clearer: if chance rules the world, anything at all is possible. There is no reason why the laws of nature should continue to operate. There is no reason why they should be mathematically elegant and comprehensible by human minds. There is no reason why there should be any laws of nature at all.

But there are laws. They are elegant and reliable. They have given rise to complex organised forms of intelligent life. Out of the logical space of possible states of affairs, the laws of physics generate 'a process that is capable of picking its way through the tree of all conceivable animals, and finding just that minority of pathways that are viable' (The Blind Watchmaker, 315). From the basic physical structure that causes atoms of hydrogen and helium to form, and fuses them in stellar explosions into heavier carbon atoms, the basis of life; from a succession of hugely improbable events like the formation of replicating molecules and eukaryotic cells, the location of a giant planet that protects earth from most destructive meteors, of a star that is not too hot or cold to support organisms, and of a moon that balances earth's climate to make it productive of life; from this long chain of extreme improbabilities intelligent consciousness emerges, capable of framing purposes in accordance with conscious evaluations of possible futures, and pursuing them responsibly.

However improbable the process, Professor Dawkins, whose strictly scientific views on evolution I would not dream of opposing, has tended to the view that sooner or later intelligent life is inevitable, or at least that the constraints of the evolutionary landscape lay down a preferred evolutionary pathway towards intelligent life.

On the one hand, the trend towards intelligent life seems to be inherent in the basic structure of the natural world. On the other hand, there is a long chain of extremely improbable events that are needed for this trend to be actualised. Any hypothesis that reduces the improbability of the process must be a good one. An obvious hypothesis is there is a direction in evolution - towards increasing consciousness and intelligence, understanding and creative freedom - and that events that would otherwise be extremely improbable are in fact made highly probable by the influence of the guiding intelligence that has set the general direction of the process.

Professor Dawkins is opposed to any such guiding intelligent influence. But it is clear that the hypothesis is not as superfluous as he claims. It vastly increases the probability that finite intelligence will come to exist in the universe. And it raises the probability that there can be veridical experience of the cosmic intelligence, in ways which that intelligence makes possible.

Professor Dawkins protests that there is no scientific evidence for it. But the evidence is precisely that an efficient and elegant process does result in states of great value, enjoyed by intelligent agents. It is true, however, that this is not scientific evidence. It is not subject to experimental confirmation, and it does not issue in precise and quantifiable predictions. That is because it is evidence for something non-physical, something not within the scope of physics. It is evidence nonetheless, that suggests the hypothesis of an intelligent creator, and that confirms that hypothesis, even though not indisputably or conclusively.

How Absolute are the Laws of Nature?

But it does not follow from the hypothesis either that the cosmic creator will intermittently intervene in the natural process, or that its purposive influence will be detectible by observation.

The language of 'intervention' belongs to a post-Newtonian philosophical worldview (which Newton did not share) that nature forms a closed and deterministic causal network. According to that view, every event is determined to be what it is, without any possibility of being otherwise, by a finite set of universal laws and a preceding physical state. The laws and the initial state entail one and only one possibly outcome.

Philosophers continue to debate this theory, but it is certainly not established by modern science - there are many contrary suggestions, the Heisenberg Uncertainty Principle suggesting that strict determinism is not a presupposition of good science, and quantum non-locality and entanglement implying that the laws of physics are not well-enough understood to enable us to claim that we can be certain of what all the laws of nature are. Determinism is a very dogmatic view, going well beyond the available evidence, and existing in some tension with many leading views of the nature of the laws of science.

If we take physical laws as prima facie principles of regularity which operate in relatively isolated conditions, then they are more like mathematical models for idealised situations, which do not fit the complex interfused patterns of the real world with perfect accuracy. As John Polkinghorne has put it, 'We have no compelling grounds for regarding current theories as being more than a form of approximation to actual physical reality as it is encountered in the limit of effective isolatability' ('Exploring Reality', SPCK, London, 2005, p. 34). The laws of nature give us approximations to reality, not precise depictions of it. They model real situations in isolation from the many complex conditions that obtain in most of the actual world. And they model reality as we encounter it rather than as it may be in itself. Thus there may be many sorts of influence at work in the cosmos, of which we are unaware, or which cannot be captured by our equations in precise form, or which do not operate in complete general, predictable, law-like ways.

If there are any personal influences in the universe (like the purposive acts of humans, for example), they are unlikely to be completely general or law-like, since they will express unique intentions in complex and unrepeatable situations. If there is a personal ground of the cosmos, its influence on the cosmos will be personal, not nomological. Such influence will not be capturable by any set of quantifiable regularities. But that does not mean such influence could not exist.

There might be, for instance, a general teleological constraint on physical regularities, raising the probability of some outcomes and lowering the probability of others. Influence is not interference, as any teachers who have influenced their pupils can tell you, but it can make a profound difference to what happens physically. It cannot, however, be quantified, isolated, or fully described by an algorithm.

If there is a cosmic mind that intends the cosmos to produce intelligent agents, then physical processes will be shaped so that they realise that intention. But the shaping need not consist in discrete and occasional violations of causal laws. It may be a more continuous and not precisely measurable influence on a physical system as a whole.

From this it follows that there will not be unambiguous evidence of particular divine actions. There will be evidence of general purposive influence. But, like the evidence of human motives and intentions in history, such evidence will always be ambiguous and susceptible of diverse interpretations. That does not mean it is not real. But where a cosmic mind and its intentions are not, even in principle, observable, it is rather unlikely that anyone could unambiguously identify precise and discrete events that proved its activity.

Creationism, ID, and Creation

Many scientists unfortunately fail to distinguish between general purposive influence and discrete and unambiguously identifiable events or objects that require reference to

an intelligent designer. In America the phrase 'intelligent design' has come to be used by many to refer to the latter view, namely, that an intelligent designer has designed specific objects that could not be accounted for on Darwinian principles, thus providing specific and unambiguous evidence for the designer's existence.

Confusion is further compounded when critics talk about 'intelligent design creationism'. The term creationism is better reserved for literal readings of Genesis 1. There are two forms of creationism. The young earth theory is that the six days were short periods of time, so that the earth is less than ten thousand years old. The old earth theory is that the 'days' could be long periods of time, even millions of years. But what makes these views 'creationist' is that in both cases God created each species de novo, and humans did not evolve from some other species.

Intelligent design theorists are not creationists, and most of them accept the descent of all organic life, including humans, from some original simple life-forms. Michael Behe, a leading ID theorist, writes, ''It is important to understand that a hypothesis of Intelligent Design has no quarrel with evolution per se' ('Irreducible Complexity', in 'Debating Design', ed. Michael Ruse and William Dembski, CUP, 2007, p. 356). ID theorists are not creationists. They accept evolution, but hold that some organisms cannot be explained in terms just of random mutation and natural selection. There are specific evidences of an intelligent designer in nature.

What complicates the issue is that the judge in the Dover School Board case held that intelligent design was being used, in that case, as a cover for creationism. That may have been the case, but we need to be clear that intelligent design is an evolutionary view, and is not creationism.

Debate in America has raged around whether intelligent design is a properly scientific theory. ID criticises the neo-Darwinian synthesis by pointing to evidence that, its proponents say, Darwinians cannot explain. That sounds like a scientific investigation that throws doubt on a proposed theory. This part of the ID case is in principle scientific. But it has not found much favour with biologists, who point out that 'irreducibly complex' systems may emerge by the opportunistic combination of bits and pieces developed for different purposes, rather than being assembled all at once in isolation. So far, this is science, though not well substantiated science.

The real problem is that ID theory does not propose a scientific hypothesis in its place. God is not a scientific hypothesis. God is not a physical entity that can be measured or experimented upon or that operates according to regular physical laws. So God seems to lie outside of present, and probably of any future, science.

If a scientific explanation is one that accounts for the occurrence of specific events by pointing to general regularities and prior physical conditions, and that can give rise to confirmable predictions, then there cannot be a scientific explanation of any acts of

God, who is not a prior physical condition, who does not act in accordance with general and impersonal laws, and whose actions cannot be predicted.

Any explanation of an act of God would have to be in terms of purpose (what God wants to achieve), a purpose which exists in an evaluating consciousness not accessible to humans (the mind of God). Physical science does not deal with private consciousness and purposes. Such purposes are extremely difficult to identify even in the case of ordinary human actions. Where the agent is not identifiable, it will be even more difficult to be sure whether there is a purpose in a specific set of events, and what it is.

Probably the best we can do is to identify events which look as if they could be purposive (as if they could be goals of rational action), and attempt to place them within a general pattern of purposive activity that looks as if it is directed to some overall goal.

The history of religion is littered with failed attempts to make such identifications, just as the history of science is littered with failed attempts to explain occurrences in terms of basic physical elements and laws.

Does that mean that there cannot be a God, or that at least a God could not have a causal influence on physical events? Not unless the only sorts of entities that can exist are physical entities, and given that science can give a complete account, in principle, of all causal influences by referring only to physical entities and the laws of their relationship. Neither of these premises belongs to science, for the simple reason that the premises do not account for occurrences in terms of general regularities and prior physical conditions. 'There are no non-physical causes' and 'The scientific account of reality is exhaustive and complete' are not scientifically explanatory. They are statements about the nature of reality, and about the range of scientific theories, respectively. They are not statements of science. They are statements about science and reality. They are, in short, philosophical statements.

Philosophical statements about reality do, of course, refer to observations and to empirical knowledge. But they are not observational or empirical statements. They are meta-statements – they ask about the nature, the proper interpretation, the implications and presuppositions of the statements people make in the sciences, as well as in morality, art, religion, and politics.

Thus a philosopher might ask whether there are any non-physical causes. No experiments will be carried out, or precise measurements recorded, or specific predictions made. There are no philosophy laboratories. Instead, there are philosophical armchairs, in which philosophers sit and think.

So ID seems to be a combination of a scientific claim – that Darwinian explanations are insufficient – and a non-scientific claim (because untestable and unverifiable by sense-

observation) – that specific empirical occurrences require reference to an intelligent designer.

There are thus two interesting questions at stake. Are Darwinian explanations of evolution sufficient? And is there, or could there be, scientific and convincing evidence for specific and identifiable acts of an intelligent designer?

Most biologists would affirm that Darwinian explanations are quite sufficient. But the issue is not closed. Proposals like Stuart Kaufmann's hypothesis of a principle of complex self-organisation are not absurd, and there may be other possibilities yet to emerge. The issue is a highly technical one, and perhaps the lay person should leave it to experts in the field. It is not good enough to say that since the Darwinian synthesis has not yet fully explained every biological fact, it never will. But equally, it is not really good enough to say that we absolutely know that purely Darwinian explanations are comprehensive and complete. Evolution is a fact. Random mutation and natural selection are major driving forces of evolution, and most biologists think they are all we will ever need. But whether they are in fact the only ones, we are not yet in a position to say.

The trouble with the ID view, assuming that the designer is not a material extra-terrestrial organism, is that it will only appeal to those who think there is an unembodied mind, a God, or that such a thing is possible. I think it is perfectly reasonable for a theist to think that there could be some evidences of design in nature. A cautious ID theorist would not say that the bacterial flagellum proves a designer. But it is so complex and amazing, so improbable and composed of such highly co-ordinated parts, that it could be designed, even if indirectly (by designing a process that inevitably produces it). If there is a designer, at this point the divine hand, if not the divine foot, could be discerned by believers. This would be beyond scientific proof, but it could be evidence, for a believer, of the hand of God at work. And would believers not be rational to expect some such evidence, somewhere?

Materialists often show a complete inability to empathise with Idealists, or to try to see how they would expect to see the world, however hypothetically. 'We do not need that hypothesis', materialists might say. Well, the ID theorist might not need it either. But a theist might have it already, for instance on the basis of personal experience or of revelation. And in that case some evidence could help to confirm the hypothesis, by showing signs of organized complexity that look very like design. In the same way, of course, some evidence could help to disconfirm it – and materialists are not slow to point to the great amount of suffering in the animal world as just such disconfirmation.

It would show a remarkable prejudice to accept evidence against design, while disallowing any evidence in favour of it. It is fairly clear that suffering and inefficiency in evolution is evidence against design, and that efficiency and highly improbable organized complexity is evidence in favour of it. If so, the issue is not absolutely convincing, either way.

Acts of God

Could there be better empirical evidence for God? It is not hard to imagine such evidence – a voice from the clouds predicting, correctly, that Fred would rise five feet in the air, turn a somersault, and transform into a banana, would be pretty convincing. But this sort of evidence requires that there is an intelligence that wants to demonstrate its existence beyond reasonable doubt by performing arbitrary and completely inexplicable actions. It is plain that there is no such intelligence, for evidence of this sort is lamentably insufficient to carry conviction. There is no God who continually performs physically inexplicable acts just to convince people that God is there. The hypothesis that there is such a God is disconfirmed by lack of evidence.

Some materialists seem to assume that if there is a God, it would have to be this sort of God. But why should that be assumed? An alternative hypothesis is that God does not wish to make the divine existence unmistakably clear, and does not wish to perform many public and unambiguous physically inexplicable acts.

Most religions promulgate reports of physically inexplicable acts – miracles – that confirm belief. But miracles are very rare, almost never unambiguous, and are not powerful enough to convince everyone. As 'proofs', they fall far short of what is required.

The resurrection of Jesus, a major miracle for Christians, was not seen by everyone in Jerusalem, was very ambiguous (Jesus was not always recognized, and some doubted the appearances), only happened once in the whole of human history, and was only reported by a small group of close disciples, in accounts that vary in detail.

If the standards of scientific evidence are applied – repeatability, testability, observation under controlled conditions – the resurrection does not do very well. But if one thinks that life after death is possible, that Jesus may have been the Messiah, that some visions are veridical, and that the disciples were trustworthy and reliable, then one may take the resurrection to be a set of veridical visionary appearances of the person of Jesus to a group of those who were partly prepared for and open to such visions.

This is confirmation. But it is not public (open to all), for the sake of proving something beyond reasonable doubt, and testable by dispassionate and detached observation. Thus the root question is: are there personal experiences, only open to some people, which provide visionary apprehensions of a non-physical reality?

The Nature of God

This opens the way to a different view of God – not a being outside the universe, anxious to prove that it is there, and interfering with natural laws in order to do so, but the inner nature of the universe itself, as universal mind. Mind is the nature of reality,

but that nature is hidden from finite beings that turn away from it towards the material world of desire, self-interest, and attachment. The laws of the universe are the laws of the self-expression of universal mind. They are rational, elegant, and universal.

God, it would be held on such a view, has no need to prove the divine existence. God may desire that humans become aware of the true nature of reality. But such awareness must be the result of a disciplined ascent from illusion and attachment towards an ego-transcending and all-pervasive Spirit.

Dispassionate knowledge of God (of the true nature of reality) is not possible by any science that limits itself to the physical. It comes from a development of personal vision and insight. This explains why miracles – physical events transcending purely physical regularities and disclosing their spiritual grounding – are person-relative and publicly ambiguous. It also explains why non-miraculous divine influence is ambiguous and beyond purely scientific detection.

Knowledge of the spiritual nature of reality is not knowledge of an additional entity beyond the universe. It is insight into the true nature of the universe itself. It is the result of a journey of self-discovery, which is also the unveiling of the universal self of which one is part. God does not need to be proved. God needs to be discerned, and the path to such discernment requires discipline and commitment.

That is why it cannot be scientifically demonstrated that there is a God, that reality is spiritual in nature. There is something self-refuting about a methodology that excludes all talk of purpose, value, and consciousness, and yet asks if there is evidence for God.

We can ask if there are signs of purpose, value, and awareness in the universe; but in doing so we will be going beyond the self-erected boundaries of natural science. That is why the ID proposal offends many scientists – it challenges their ultimate world view, and tries to import into science all that has been specifically excluded from it since the sixteenth century.

There can be such signs only if we accept the coherence of the idea of a cosmic mind, which could have purposes, appreciate values, and have awareness without any physical substratum.

It may be said that if we just look at physical nature in a scientific way, we would never come up with the idea of a cosmic mind that expresses itself in nature. There would never be enough evidence for that supposition. Such a view exhibits two major mistakes – first, that good explanatory postulates are minimal inferences from observation, and second, that only the natural sciences can make good explanatory postulates; philosophy is not allowed to do so.

It is a very natural hypothesis that the cosmos is the expression of mind, since mind is the most obvious thing we humans know, and without it we would have no knowledge

of anything. But in making that hypothesis, we are adopting a personal attitude to the cosmos, seeing it as purposive and valuable, and responsive to human acts and thoughts. The natural sciences firmly exclude taking such a personal attitude, and stress the importance of dispassionate observation and experiment. So the theistic hypothesis is not scientific. It expresses a view about what things are ultimately real, and it presumes that scientific analyses of the physical world apply to the realm of appearance, and not to the more ultimate realm of spiritual, noumenal, mind-like, reality. This is not a minimal inference, it is the statement of a comprehensive, elegant and coherent conceptual scheme for interpreting reality. It is an explanatory postulate that subordinates scientific theories to the realm of appearance. The view that there is no spiritual realm beyond that is a meta-scientific theory that cannot be established on purely scientific grounds.

I have argued that the general process of evolution can be seen as evidence for an intelligent creator, though I concede that many, perhaps most, biologists, do not see it that way. But that is largely because they hold a materialist worldview that does not allow the possibility of a conscious supernatural reality. I have also shown that many biologists argue that Darwinian evolution eliminates the possibility of an intelligent designer, holding that any such designer would be lazy, stupid and cruel. But that is only true if we think of a designer directly designing every organism as perfect – in other words, the creationist view that God creates each species directly. As I have stressed, the ID view is not creationist, and sees evolution in terms of mutation, trial and error, and natural selection. The designer of such a process would be extremely intelligent, since the process is both efficient and guaranteed to reach goals of great value.

From the unconscious circling of electrons arises the conscious formulation of an Einstein equation. From the value-indifferent interactions of unfelt physical forces arises the transfiguring beauty of a Beethoven symphony. From the blind mechanisms of molecular conflict arises the intelligent formation of future goals and purposes. And from the deterministic processes of atomic interactions arises the creative pursuit of responsible freedom.

The basic laws and processes of nature are remarkably, indeed perhaps uniquely, well-formed for the arising of conscious intelligent agency by a process of cumulative and progressive development from a primal relatively simple material origin. The process is efficient. That is one vital element of a design-explanation.

Values

But what of the values it produces? Are they really worth-while?

Again, I will utilise some words of Professor Dawkins. At the end of his fascinating book 'The Ancestor's Tale' (Phoenix, 2005, p. 628 f.), he writes of his consideration of the process of evolution, 'My overwhelming reaction is one of amazement'. He goes on to

advocate a sense of reverence for life, even of piety and reverence, before the 'sublime grandeur of the real world'. So seeing evolution as cruel is not the whole story. Evolution is an amazing, sublime, reverence-inspiring process, of great beauty and elegance. This seems to be supremely worth-while. And the particular values of this world, and the particular personal agents who come to exist in it, could not exist at all in a world without risk, pain, conflict or frustration.

There could, after all, be an intelligence who wanted to create sorts of value that could only exist in a universe that contained some suffering, and the ineliminable possibility of much more suffering under specific conditions. Perhaps the creator necessarily expresses itself by creating such a world. We need to escape the naïve picture of a supernatural person who could create a perfect world, but chooses not to. We could think, instead, of a cosmic mind that by its own innermost nature expresses itself in relation to a community of personal beings that are morally free, capable of self-development through disciplined action, uniquely creative, cumulatively complex, socially related, and oriented, though not compelled, towards the ideals of beauty, goodness, and truth.

The existence of such beings could reasonably be considered to be intrinsically worth-while. But they can only exist in a universe the structure of which permits creative and co-operative action. That entails that the physical laws are flexible and open enough to allow alternative possibilities of action, and forms of holistic causality that enable complex organized physical structures (like brains) to exercise causal influence on their less complex constituent physical elements.

This, it is reasonable to suppose, entails a degree of indeterminism in basic physical laws, which, seen from the point of view of the simple physical elements themselves, will seem random (indeterminate), though in fact there will be a stochastic (not wholly determinate, but statistically predictable) propensity towards complex self-organisation.

In such a universe chance would play an important part, as the necessary basis for emergent creativity and personal agency. Such a world would contain the possibility of conflict, evil, and frustration of the divine intention. But in it God could work patiently to attract persons by love towards the goal of a creative and harmonious community, devoted to goodness and beauty and friendship. It would not be absurd to describe the character of such a God as 'self-giving love', though we would have to see such love as operating in a cosmos that is developing and autonomous and necessarily expressed in an incessant dialectic of creation and destruction. God creates such a cosmos by necessity, and seeks to move it towards conscious communion with that perfect Beauty beyond all finite worlds. In this process, values are realized that could exist in no other world. Even though the world falls far from perfection and into isolation and self-destruction, it does not fall into complete non-being, and it can be drawn onwards towards that eternal communion of being which is love.

The nutshell response to the very real problem of suffering and evil is that we humans could only exist as the sort of emergent, creative, social, and self-shaping beings we are, in a universe like this in its general features. If we are to exist, this universe, in its general structure, is necessarily the way it is. The Christian claim, based on divine revelation, is that we have a future beyond this cosmos in which we can grow into fully conscious communion with a being of absolute beauty and bliss. If anyone is to take Christianity seriously, they must consider such a claim, founded on belief in a good God and on the experience of the risen Christ, with proper attention.

It is unreasonable to call the creator of such a process malevolent or incompetent. But it is true that we cannot see God as a kindly being who could have created us without suffering, but chose not to do so. Major theologians never have seen God like that, but it is a consequence of more naïve views of what it is for God to be loving.

Evolution teaches us that we are integral parts of a developing cosmos, and that we could have been born in no other universe. It is an efficient process that issues in many states of great and otherwise unobtainable value. So it certainly looks purposive. But it contains much suffering, conflict, and destruction, and that certainly leads one to question whether a good and intelligent creator could be responsible for such a process. I think the only possible response is to say that these things are necessary to the sort of universe in which alone we could exist. For some, that may be enough. But most religious believers suppose that there is value beyond our wildest expectations in the presence of God. That would enable us to affirm that all things work together for good, and that the creation is indeed very good. I would not expect evolutionary biologists to accept that on the evidence of biology alone. But I would expect them to allow that there might be other sorts of evidence and argument about the ultimate nature of reality, about the objectivity of consciousness and value, and about the possibility of revelation. So I would expect them to stop talking about the malevolence, cruelty, and incompetence of a creator, and to recognize that these evaluations are beyond the competence of scientific biology, that they rest on ignorance of competent theology, and that they rely on unduly anthropomorphic views of what God is.

If evolutionary biology does indeed rest on a presupposition of materialism, and if it encourages ill-considered and prejudicial remarks about religious beliefs, then it should not be taught in schools. Of course I will probably be called an 'intelligent design creationist', and, if I held office in the Royal Society, I would be asked to resign. What that shows is the urgent necessity for some clear distinctions to be made and for some hard thinking to be done about the way in which ideological presuppositions can be built into what is called pure science in a most misleading way. And the culprits in this case are not ID theorists; they are some of our most eminent scientists, who think they are just being objective, wholly dispassionate and reasonable. The time for a more serious and penetrating discussion has come.

Response to Keith Ward

John Polkinghorne

Keith Ward has given us a characteristically vigorous and acute rebuttal of imperialist claims that science tells us all we need to know or all we could conceivably know. In fact, such a claim is self-defeating, since it itself is manifestly not a scientific statement but a highly disputable philosophical assertion about the scope of human epistemological powers.

The fact of the matter is that science has achieved its very great success by the modesty of its actual ambition. When it is honest about itself, it cannot claim to address every question of significance, but simply those that relate to the processes of the world. Questions of whether purpose and value are to be discerned in these processes are simply bracketed out of its enquiry. It limits itself also to a particular kind of encounter with reality, treated as objective and so available for investigation through repeated experiment. As a theoretical physicist I am happy to acknowledge the value of the weapon that experiment has placed in the hands of scientists, but it has a distinctly limited power. There are many encounters with reality where we meet it not as an 'it', open to our manipulation and interrogation, but as a 'thou' to be met with in trust rather than being put to the test. If I am always setting traps to see if you are my friend, I shall soon destroy the only possible basis for friendship between us. When they remember that they are persons, scientists can see this as clearly as anyone else. The truth of the matter is that science trawls experience with a coarse-grained net, and many things of the greatest significance slip through its wide meshes. There is much more to our experience of music than can be expressed by the Fourier analysis of sound waves.

Even within its own self-limited domain, science's success is limited. For example, physics is not able to give us a unique account of causal structure. Quantum physics is undoubtedly probabilistic, but is this due to intrinsic indeterminacy or to necessary ignorance of the factors operating in a deterministic world? Either account can be made to fit experiment and the choice between them has to be made on metaphysical grounds. Moreover, physics is distinctly patchy in what it understands. Quantum theory, relevant to subatomic phenomena, and chaos theory, relevant to macroscopic phenomena, cannot be consistently reconciled twith each other, since the former has an intrinsic scale, set by Planck's constant, while the latter's fractal character implies it is scale-free.

While science brackets out value from its discourse, the experience of doing science is certainly not value-free. An essential word in any scientist's vocabulary, though absent from the learned journals, is 'wonder, arising for the physicist from the deep and beautiful order of the universe, and for the biologist from the extraordinary fruitfulness of the evolutionary history of life. Keith Ward has reminded us that 'purpose' is not a

word allowed in strictly scientific writing, but the fact that over 13.7 billion years an initial almost uniform ball of energy has turned into the home of self-conscious beings capable, amongst other things, of gaining a scientific understanding of that long and fertile process, surely does raise in one's mind the possibility that something may have been going on in cosmic history and it is not just a meaningless concatenation of one damn thing after another. I am always puzzled that so many biologists vehemently deny that there is any real progress discernible in the history of life. I would think that there is a very obvious gain in value in the transition from a world that for more than two billion years had only single-celled organisms in it, to a world with saints and scientists among its inhabitants.

Of course there has been much contingency in that fruitful history. I am not suggesting that *homo sapiens*, in all our five-fingered particularity, was an inevitable outcome, but I find it hard to believe that the emergence of self-conscious beings, somewhere, some time, was just an incredibly happy accident. Certainly, the role of contingency is not a sign that cosmic history is a meaningless tale, told by an idiot. Quite the reverse, in fact. It is a very general insight, both in physics and biology, that the regimes in which true novelty can emerge necessarily exist at what we may call 'the edge of chaos', where regularity and contingency, order and openness, intertwine. Too far on the orderly side of that frontier and things are too rigid for anything really novel to emerge. Too far on the haphazard side of that frontier, and any novelty that emerges will be unable to persist. If there were no genetic mutations, then species would be unalterably fixed and incapable of development into new forms of life. If mutations were too frequent, no species could become established on which the sifting process of natural selection could act. Religious believers will be able to so see the gift of orderly necessity as a sign of the faithful reliability of the Creator, and the role of 'chance' – which simply means the contingent character of what actually happens – as the Creator's gift to creatures of the power to 'make themselves', as Charles Kingsley said in responding to the insights of his friend, Charles Darwin.

Evolutionary process, whether the physical formation of stars and galaxies, or the more familiar biological story of life, has proved astonishingly fertile, but it has a shadow side as its inescapable cost. Genetic mutation will produce new forms of life, but it will also prove to be a source of malignancy. You cannot have the one without the other. The anguishing fact of cancer is not gratuitous, something that a Creator who was a bit more competent or a bit less callous could easily have avoided, but it is the necessary cost of the great good of a world in which creatures are given the freedom to be themselves and to make themselves.

I share Keith Ward's reservations about the ID movement. Although it is scrupulous to avoid the overt language of theism – it speaks of design but is coy about the possible nature of a Designer – yet it has an obvious subtext which is theologically mistaken. Its adherents seem unwilling to acknowledge that the Ordainer and Sustainer of nature acts as much through natural processes as in any other way. If, as I think likely, the

origin and complexification of life is a story expressible in scientific terms without gaps, that would by no means imply for me that God had no hand in it.

We live in a world of deep and wonderfully intelligible order, immense fertility, the carrier of beauty and the arena of moral choice. I am not content to treat these facts of high significance as it they were just happy accidents. Theism enables me to see the order of the universe as the sign of the divine mind, its fruitful history as the expression of divine purpose, our experiences of beauty as a sharing in the Creator's joy in creation and our moral intuitions, not as disguised strategies for genetic success or mere conventions of society, but a true perceptions of God's good and perfect will. Keith ends with a call for the opening of a more serious and penetrating discussion than has mostly been going on up till now as scientists engage with religion. Neither of us would claim that our atheist opponents are stupid – that is clearly not the case – but I think we both would claim that theism explains more.

The Trustees are pleased to announce that next year's Boyle Lecture will be given by

Professor John Hedley Brooke

John Hedley Brooke was the first Andreas Idreos Professor of Science and Religion within the Faculty of Theology at the University of Oxford from 1999 through 2006, when he retired from the post. In 2006 he became president of the Science and Religion Forum. He was formerly Professor of the History of Science at Lancaster University and is a Fellow of Harris Manchester College, Oxford.

Professor Brooke has taught many courses ranging from the history of the physical and life sciences to the philosophy of religion at the universities of Cambridge, Sussex, and Lancaster. He has been President of the British Society for the History of Science and of the Historical Section of the British Association for the Advancement of Science. His research interests include the use of historical analysis to construct critical perspectives for the discussion of sciences as they bear on religious beliefs and religious beliefs as they bear on the sciences.

He has lectured at many universities in America, Europe, Australia and the Far East. He has also lectured at Templeton workshops in Adelaide, Berkeley, Manchester, and Toronto. In 1998 he joined the Templeton Oxford Seminars Steering Committee, and gave several lectures at the 1999 seminars and led workshops at Wycliffe Hall. In October 1999 he was appointed the first holder of the University's newly created Andreas Idreos Professorship of Science and Religion, and was also the Director of the Ian Ramsey Centre until his retirement in 2006. During November 2000 he gave the Alister Hardy Memorial Lecture in the University of Oxford, and in November 2001 gave the Distinguished Lecture of the American History of Science Society at its meeting in Denver.

Professor Brooke also holds a number of research directorships. He is coordinator of the European Science Foundation Network on Science and Human Values. Since 2002 he has been a foundation member of the Steering and Executive Committees of the International Society for Science and Religion, and in 2003 he was elected Vice-President of the Science and Religion Forum. In the same year he was elected to the Senior Historians Conference in Windsor. He is co-director (with Martin Rogers) of the Templeton Science and Religion in Schools Project, and in 2004 was appointed co-director of the Oxford Centre for the Science of Mind (OXCSOM).