

## **‘Has Science Made Religion Redundant?’**

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**by Denis Alexander**

First I must apologise for not being John Polkinghorne. John is actually a good friend and he speaks very often at our Faraday Institute Courses, so I’m tempted to do the chauffeur routine and try and give one of his talks. But commonsense suggests that wouldn’t be a great idea. Having said that, let me say that I’m delighted to be the recipient of such a great title, that actually encompasses some of the great questions that face us at the start of the 21<sup>st</sup> century.

I suppose the first and most obvious point to make is that there’s no such thing as Religion, with a big ‘R’. No society in the world has yet been discovered without a religious belief system. Occasionally claims have been made of finding a new society that lacks any kind of religion, but further research has revealed that it’s there, albeit in a form not recognised by those anthropologists who first started their investigation. According to the editors of the *World Christian Encyclopedia* there are 19 major world religions which are subdivided into a total of 270 large religious groups, and thousands of smaller ones, including a staggering 34,000 distinct Christian groups. No wonder that anthropologists have a hard time coming up with precise definitions of ‘religion’ that everyone agrees on.

So perhaps a more manageable question to address is: ‘Has science made certain religious beliefs redundant?’ or at least certain beliefs that receive support and validation from religion. And here quite clearly the answer is ‘yes’. For example:

The earth is not 10,000 years old but 4,566 million years old. You can still find people who believe that the earth is very young, and support their belief by texts from the Bible or the Qu’ran, but science has shown this belief to be redundant. Of course the irony in this case is that the great age of the earth that was established from the late 18<sup>th</sup> century onwards was largely established by Christian natural philosophers as scientists were then called. One of the main figures in establishing the geological column was an evangelical cleric, the Rev Adam Sedgwick (1785–1873), appointed as first professor of geology at Cambridge at the age of thirty-three.

Another religious belief that I think science can show is redundant is the belief strongly held by a sect in the USA that handling poisonous snakes in the middle of a service is not dangerous and you won’t die from that. Actually, that’s not true and you might well die if you get bitten, and people do. Not a practice to be recommended. Not something that generally happens in the Church of Scotland from all I hear.

Another religious belief. Some traditional African religions support the idea that traditional healers can cure AIDS. The idea is false. When you measure the outcome of their healing approaches, people still have AIDS. They are not cured.

One could go on, but you get the point. It's fairly easy to find religious beliefs of some kind, or beliefs sustained by religion, and show that they're false using science. They are redundant. But of course that doesn't get us very far in our discussion, because the religious believer will want to say that whilst clearly there are plenty of beliefs represented by the 270 major religious groupings of the world which are redundant in the light of science, nevertheless there is a core of really important religious beliefs that are certainly not redundant.

Enter Richard Dawkins, who else, Professor of the Public Understanding of Science from Oxford University, who would like to say that all religious beliefs of whatever kind are redundant in the light of science, including the shared belief of the Abrahamic faiths that there is one God, creator of everything that exists, who has intentions and purposes for the universe that he has brought into being. So Dawkins writes that "I pay religions the compliment of regarding them as scientific theories and ... I see God as a competing explanation for facts about the universe and life" (1995). So in this account science and God are seen as offering rival accounts for the reality around us. With such a view conflict between science and religion is of course the inevitable outcome. But whether to see God as providing a competing explanation for facts about the world is truly a compliment to religion, or simply a muddle about the nature and scope of science, is clearly a question that requires further attention.

Dawkins is not the only person who has a very triumphalist view of the scientific enterprise. Peter Atkins, Professor of Chemistry at Oxford, advocates the "omnicompetence of science" and believes that "science, with its

currently successful pursuit of universal competence ... should be acknowledged king" (1995). "Science", says Atkins, 'has never encountered a barrier that it has not surmounted'.

The American philosopher Daniel Dennett writes in *Darwin's Dangerous Idea* (Penguin 1995, p. 82) that "Darwin's dangerous idea is reductionism incarnate, promising to unite and explain just about everything in one magnificent vision".

In his book *Consilience - the Unity of Knowledge*, E.O Wilson proposes the ultimate unification of all human knowledge via the pathways provided by the natural sciences.

And there are many scientists who even with our current limited knowledge wish to claim that the descriptions provided by their particular discipline provide the real understanding of what's going on, and that understandings from other perspectives are illusory. So we have the late Francis Crick writing that "The Astonishing Hypothesis is that 'You', your joys and your sorrows, your memories and your 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*, London: Simon & Schuster (1994), p. 3].

Now the response of some people to such comments, especially some religious people, has been to downplay the success of science in order to highlight its deficiencies, or even to call for a halt to progress in a particular line of scientific enquiry. I have to say that is not my own conviction. Having spent

the past 40 years of my life in scientific research, you won't be surprised to hear that I am an enthusiast for science. In fact I've had the great privilege of working in three quite different research fields over this time, first in neurochemistry – then later on in human genetics – and more recently in immunology and cancer. There are other scientific disciplines that I would love to be involved in, but life is too short. The one reason why I'd like reincarnation to be true is so that one could be re-cycled many times through life, enjoying a different scientific discipline on each cycle. That would be fantastic, but I fear is just not the case.

So I would agree completely with Atkins, Dennett and Crick that we should press the scientific explanations as far as we possibly can. There are no hidden corners of the universe, or indeed our own brains, where we should put up a sign saying 'keep out – no further investigation allowed here', although of course we should place ethical limits on the applications of science, something very different.

Instead the appropriate response to Atkins and Dawkins, I would suggest, is to ask some rather basic questions about science itself. What is it? And what are its scope and its limits? In the middle ages the term 'science' was used to refer to virtually any body of accurate constructed knowledge. Theology was famously known then as the 'queen of the sciences' because it was deemed to encompass all other forms of knowledge. In past centuries what we now know as 'science' was more commonly called 'natural philosophy' and those who pursued it were known as 'natural philosophers'. The word scientist is of relatively recent origin and was invented in 1834 by a cleric called William Whewell who was

Master of Trinity College and one of the great polymaths of 19<sup>th</sup> century Cambridge. Whewell also invented lots of other words like physicist, cathode, anode and so forth. So if you're a physicist its good to remember that your profession was labelled by a 19<sup>th</sup> century Anglican cleric.

In its modern sense today, everybody knows what science is.... until asked to define it, then things can get a bit fuzzy. So lets have a try at a definition: 'Science is an organised endeavour to explain the properties of the physical world by means of empirically testable theories constructed by a research community trained in specialised techniques'. This definition is not perfect but it does, I think, encompass most aspects of contemporary science. So there are certain key properties that are characteristic of the methods of modern science, that help us to know that we're talking about science and not something else. SLIDE. For example:

1. Science in its methodologies excludes questions of ultimate purpose, value and significance. By contrast Aristotelian science included final causality as one of the explanatory features of nature. But empirical science only really began to take off in the 16<sup>th</sup> and 17<sup>th</sup> centuries as it became more modest in its ambitions and began to exclude the consideration of final causes.
2. Science looks for testable hypotheses
3. Science aims at formulating generalisations about the properties of things whenever possible; the highest levels of generalisation are called 'laws'.

4. Science values mathematics highly and incorporates mathematical assessment whenever appropriate and feasible.
5. Science aims at objectivity and down-plays the role of the scientific observer, deliberately excluding the personal.
6. Scientific knowledge aims to be publicly observable and repeatable; it is only taken seriously within the scientific community following publication in peer-reviewed journals. In a sense you can define science by what is contained within the pages of scientific journals.

So the goal of the scientific community is to generate a body of reliable constructed knowledge that is deliberately restricted in its ambitions to explaining the properties of the physical world. Science achieves clarity only at the price of looking away from layers of nature available to other kinds of experience.

So there are a number of interesting points that we can make about the nature and scope of scientific knowledge that are highly relevant to addressing the question: 'Does science make religion redundant?' Here are some of them:

First, the claim that science is the only valid kind of knowledge is self-refuting.

Second, science cannot explain itself.

Third, science alone cannot do justice to the richness of well-justified human knowledge.

Fourth, science cannot address the ultimate metaphysical questions of life, to which all human-beings are committed.

So lets just spend a little time looking at these four claims.

First, the claim that science is the only valid kind of knowledge is self-refuting. This philosophy, usually known as scientific naturalism, claims that science is the only true source of knowledge. It is therefore fair to ask whether science itself can be used to justify naturalism. It cannot. The data which science generates can provide no support for or against such a philosophy. Since the truth of scientific naturalism cannot be scientifically demonstrated, it cannot be a valid form of knowledge, so suffers from an inherent contradiction. A philosophy that has to start with an inherent contradiction before it even gets off the ground should be treated with suspicion.

Notice that we are not talking about the practice of science here, we are talking about the philosophy that is parasitic upon science, the philosophy that claims that science provides the only valid form of knowledge.

Second, science cannot explain itself. Many scientists do not realise that they have to make a whole range of philosophical assumptions, assumptions not provable by science itself, before the scientific enterprise can get started. For example, you need faith that the universe is comprehensible, that it's coherent, that we have the potential to understand it. That maybe seems obvious to us now after a few centuries of doing science. But it was not at all obvious to people before modern science began.

That point was brought home to me very vividly recently by reading Paul Davies' recent book *The Goldilocks Enigma*. Davies is a cosmologist who is not himself committed to any particular religion, but who looks at the universe as a person intrigued by its remarkable coherence. Davies writes (p.16):

"Even atheistic scientists will wax lyrical about the scale, the majesty, the harmony, the elegance, the sheer ingenuity of the universe of which they form so small and fragile a part. As the great cosmic drama unfolds before us, it begins to look as though there is a 'script' - a scheme of things - which its evolution is following. We are then bound to ask, who or what wrote the script? Or did the script somehow, miraculously, write itself? ...

The fact that the universe conforms to an orderly scheme, and is not an arbitrary muddle of events, prompts one to wonder - God or no God - whether there is some sort of meaning or purpose behind it all. ..."

On the next page Davies relates this to the atheist physicist Steve Weinberg's famous statement, 'The more the universe seems comprehensible, the more it also seems pointless.' Davies asks, 'Can a truly absurd universe so convincingly mimic a meaningful one?' Good question.

So the comprehensibility of the universe is something for which science itself has no explanation. As Einstein put it "The most incomprehensible thing about the world is that it is comprehensible."

In science we also have to take on trust that matter behaves in a reproducible way. If we do an experiment this week, and repeat it under the same conditions, then we should get the same result next week as well – we hope! Again as scientists we are so used to consistency in the properties of matter, that we just take that for granted.

And all scientists have to make the assumption that their minds are rational enough so that they can obtain true understanding of the universe through

science. Now of course that's a very reasonable assumption – but you cannot prove that assumption from science itself – you can only assume it's correct and then commit yourself to the scientific enterprise. Charles Darwin found this point particularly troubling, writing that “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. Would any one trust in the convictions of a monkey's mind, if there are any convictions in such a mind?”

Now as it happens I think there are some quite good reasons from evolutionary biology to suggest that our brains, most of the time, provide us with reliable on-board computers for working out reasons for things, but I would be the first to admit that those reasons have validity only if I first assume the truth of what they conclude.

So it turns out that all scientists – whether they are atheists, agnostics, or have some religious beliefs, are actually committed to certain assumptions that are essential for science to work, things that have to be accepted as ‘brute facts’ that cannot be proved by science itself. All scientists have a kind of faith in this sense.

Now those three assumptions just mentioned didn't just appear out of nowhere - it's fascinating to realise that all three are rooted in the Christian world-views of the founders of our modern scientific disciplines. There are hundreds of examples of early scientists who saw their faith as feeding directly into a positive attitude towards the scientific enterprise – many of these scientists

were founders of the disciplines that we study today. people such as Robert Boyle, one of the founders of modern chemistry; the astronomers Kepler and Galileo; naturalists such as John Ray and Linnaeus; and natural philosophers working in the physical sciences such as Isaac Newton, Michael Faraday, Clerk Maxwell and Eddington, to name but a few. The founders of the Royal Society in England in the mid seventeenth century consisted mainly of Christian believers, many of whom understood the goal of the scientific enterprise as the uncovering of the works of God's rational creation.

And there is good historical evidence in the writings of Boyle, Newton and Descartes in particular that the idea of scientific laws itself came from the Biblical concept of God's laws, reflecting God's consistent actions in his creation of the universe. As Descartes wrote to Mersenne, on April 15, 1630: "God established these laws in nature, in the same way as a king establishes laws in his kingdom." What is more, God put them in our souls, "as a king would inscribe his laws on the hearts of all his subjects, if he were able to do it".

In 1690 we find Boyle writing that "The laws of motion, without which the present state and course of things could not be maintained, did not necessarily spring from the nature of matter, but depended upon the will of the divine author of things".

So it turns out that the Christian world-view was very important for nurturing the key assumptions that make science possible. We don't have time to review all the historical data here, but if you take the key starting assumptions of science, the assumptions that science itself cannot prove – that the universe is

rational, that the properties of the universe are reproducible, and that our brains are sufficiently reliable to comprehend the workings of the universe, then you find that in each case these convictions were nurtured by Christian natural philosophers in the fertile theological soil of the 17<sup>th</sup> and early 18<sup>th</sup> centuries. Not only do scientists have to practice a kind of faith before they start on their science, even though they may be atheists or agnostics, but perhaps they do not realise that their faith in the possibility of science has some specifically Christian roots.

Indeed, this has raised the question as to whether the scientific enterprise can be sustained in the long-term without those metaphysical underpinnings that nurtured its emergence. At the moment the question itself lacks plausibility because science is now so integrated with our economic life. On the other hand there is deep public suspicion about the value of scientific knowledge, so I think the question is at least worth raising.

Now what about our third main point - that science alone cannot do justice to the richness of well-justified human knowledge? We have already noted that the success of science is partly due to the modesty of its ambitions. The great goal of constructing a body of reliable scientific knowledge inevitably comes at a price.

Imagine, for example, that the book of this complex entity called life is like a cube sliced into many layers as shown here - and by 'life' I mean the total sum of all that we experience. You need all the various levels of explanation to do justice to this complex reality that we call life. In reality it's one book, but

our brains are simply not up to the herculean task of grasping the book in its entirety all at one go.

So the scientific level of understanding tells us how things work and where they come from; the moral and ethical level addresses what we ought to do in the world; the aesthetic level gives insight into our understanding and appreciation of beauty; the personal level addresses the ways in which we construct our biographies in the world. And at the religious level we're asking questions like: Why is there a universe anyway? What breathes fire into the equations? Does life have any purpose in an ultimate sense? Does God exist?

Notice that these various explanatory levels are in no sense rivals to each other - there are many complementary explanations for the reality around us and we need them all to do justice to our own experience as human agents.

Sometimes scientists become so enthusiastic about the power of their particular discipline to explain things that they get carried away and begin to think that their level of explanation is the only one that matters. Listen, for example, to Richard Dawkins:

“We are machines built by DNA whose purpose is to make more copies of the same DNA....That is EXACTLY what we are for. We are machines for propagating DNA, and the propagation of DNA is a self-sustaining process. It is every living objects' sole reason for living”.

Now every biologist agrees that one aspect of living is to pass on our DNA to the next generation. But the claim that this is every living objects' sole reason for living merely seems eccentric. Surely there can be many different kinds of

reason for living, and the religious believer would wish to point out that the most important type of reason is that relating to the question of ultimate purpose and meaning – the religious question. The book of life has many layers of narrative, and it seems arrogant of the biologist to claim that their particular layer is the only one that matters.

Normal reductionism is essential as a methodological approach in science – if you want to understand how a car engine works, take it to bits. But extreme reductionism claims that it's the bits themselves that represent the 'real' story, not the bits functioning together as a whole. This tendency to focus on the bits has been dubbed 'nothing-buttery'. Extreme reductionism is often identified by the words 'nothing but' or 'no more than' in its descriptions. The quote from Crick mentioned earlier provides a perfect example: 'You' "are in fact no more than the behaviour of a vast assembly of nerve cells and their associated molecules".

The problem with Crick's or Dawkins' view of science is that they think that the scientific story is the only story that's worth telling, that there are no other valid stories that can be told about the world and about our own lives. But this is a curiously flat view of the world – as if we're living in Flatland with only two dimensions, where we can only see a sphere as if it's a circle. But all that we know about our own experience suggests that our lives are multi-dimensional, you need many different types of explanation to make sense of it. The scientific story is important, but the questions of ultimate purpose and meaning which lie beyond science, and which science is unable to address, are even more important.

In reality if you did an analysis of all the news–stories and articles in the newspaper that you read today – and then asked the question “How does scientific knowledge impinge upon this or that particular issue?”, then I think you would find that the answer is “not a lot”. Science is not going to tell you how to live your life: no sane person actually tries to live their life based on scientific knowledge alone. You can collect all the scientific data you want, but they won’t help you to fall in love. If you say to your sweet-heart “darling your neurons are really firing wonderfully tonight” – she probably won’t appreciate it. Science may enable you to build more powerful weapons of destruction but it doesn’t tell you whether you ought to invade other countries. Science is not going to decide whether a painting, or poetry, or piece of literature, or a sunset, is beautiful or not. In fact, effectively all the humanities lie beyond science, which is obviously why we have different faculties and departments in our universities. If science was really all we need then we’d only have need of a single faculty in each university!

Ironically, today the pace of scientific advance is so rapid that far from declaring religion redundant, it’s far more common now to find science looking to theology for moral help in resolving ethical dilemmas. It’s science itself which is highlighting the need for more theological reflection: ‘What is a person?’ ‘Where does human value come from?’ ‘How far should we go in manipulating persons’?

I hope you can see from the discussion so far why Christians have no time for the god-of-the-gaps type of arguments for God’s existence, although Dawkins seems to think that Christian faith depends on precisely that kind of

argument. This is the suggestion that the actions of God are in some special sense indicated by pointing to arenas of our current scientific ignorance. We can't currently understand something scientifically, so God must have done it – a very poor type of argument. Of course the Christian understanding of creation completely undermines such 'god-of-the-gaps' type of arguments. In the Bible God is seen as the creator and sustainer of all that exists, or as Augustine succinctly put the point back in the early 5<sup>th</sup> century: 'Nature is what God does'. So in this view our current scientific ignorance is irrelevant to the question of whether a creator God exists, for all our scientific descriptions are, by definition, descriptions in some sense of God's actions. Once we realise that many layers of complementary narratives are necessary to provide complete explanations for things, then we will find that god-of-the-gaps type arguments are automatically subverted, and a lot of Dawkinsian rhetoric simply dissolves.

Now we might agree with all that's been said until now, but still have the strong feeling that scientific explanations are the only ones that provide us with reliable knowledge, whereas all other kinds of explanation for things belong to the realm of subjective opinion. At a mundane level I think it's fairly easy to show that that feeling is false. In fact each different discipline has its own valid ways of justifying its beliefs: legal beliefs require legal justifications; historical beliefs require historical justifications, and so forth. If a married person has been happily married for 40 years with a partner who has shown consistent love and faithfulness over those years, demonstrated by repeated acts of kindness, then that person is well justified in their conviction that their partner loves them.

That's not science, but nothing in a scientific journal will be better justified than such a belief. So well-justified beliefs are definitely not just the realm of science, and that of course includes religious beliefs.

And that brings me to my fourth point, that science cannot address the ultimate metaphysical questions of life, to which all human-beings are committed.

I would like to suggest that there is no such animal as an uncommitted human being. Every person has a world-view, a set of metascientific or metaphysical beliefs, that is, beliefs that lie beyond science, that are highly influential in ordering the direction of their lives. Very often they are unable to articulate those beliefs very clearly, but if they did so they would find that they represent the accumulation of many centuries of philosophical and religious thinking from their particular culture, usually absorbed by a process of unconscious osmosis by upbringing and education. And I take scientific naturalism or atheism or agnosticism to represent metaphysical beliefs, to which people are committed, just as much as religious beliefs. No-one is able to view the metaphysical beliefs of others from some lofty mountain top devoid of metaphysical vegetation. But of course the good news is that we are able to take those beliefs out, as it were, and examine them and see if they stand up to the close light of critical scrutiny. One always hopes that this kind of process is what a good university education will stimulate.

So how do we go about the process of comparing rival metaphysical beliefs? In science you can do very specific experiments to get precisely the data

you need in order to decide whether your theory is correct or not. But what happens when we're looking for coherence in response to the bigger questions of life: why are we here? Does life have any meaning? Is there a God? How do we go about the business of comparing the big rival metaphysical world-views that attempt to give some answers to those questions that science is unable to adjudicate?

My suggestion at this point is to include as data pretty much anything that strikes us as significant during our daily lives. We can perhaps imagine the big rival metaphysical beliefs as Big Circles that contain within them a lot of smaller circles that together comprise the compositions of our lives - 'music'; 'art'; ethical decisions; personal relationships; scientific knowledge; history; social studies; and lots of other things. And so our question here is "What big circle makes best sense of the data?"

On one side we have atheism with its claim that the universe is simply a brute fact without need of any further explanation, which is a research-stopper actually, something that we don't like in science. On the other side we have a more open-minded quest which suggests that there is an ultimate explanation for the existence of the universe and of conscious observers within it. Which metaphysical claim makes the best sense of the universe? Which is most coherent? You'll never get complete coherence in this life, but you can certainly ask the question which model is more coherent?

The atheism of Dawkins suggests that there is no ultimate purpose or meaning in the world, as Dawkins himself says just "blind, pitiless,

indifference”. Christian theism suggests that there is an ultimate purpose – we are really meant to be here, the universe was ‘waiting for us’ as Paul Davies puts it. The universe with its  $10^{22}$  stars actually has to be this big in order for us to be here – anything smaller and the universe would not have existed long enough for intelligent life to emerge. Our own planet displays a striking increase in biological complexity with the arrow of time which leads finally to creatures who can pray and respond to God’s love.

In the discussion sections at the end of our scientific papers we scientists tend to use the phrase quite a bit: “The data are ‘consistent with’ our favourite model whatever that might be. That’s the approach I’m suggesting here. What world-view gives most coherence to the world in which we live? Can we say that the data of life, taken as a whole, are consistent with the world-view that we maintain? Christians believe that it is God as creator, with intentions and purposes for the universe, who provides the best ultimate explanation for its existence and for the fine-tuning of its physical properties that enable our own existence. It is this conviction that renders the data coherent, that makes most sense of what we observe.

So ‘Does science make religion redundant?’ What I’ve been suggesting today is that the boot is actually on the other foot – in fact modern science was born out of a theological womb – that’s where many of its main assumptions actually come from. Science has now grown up to at least the stage of being an independent, stroppy teenager, inclined therefore to forget its parental roots and claim that it has all the answers. But I’ve been suggesting that the

scientific enterprise, wonderful as it is, is severely constrained in the kinds of questions that it can address. We need many types of narrative to do justice to this complex phenomenon that we call life. Religion is no more declared redundant by science than is history, law or the arts.

I will let Lord Martin Rees, President of the Royal Society, have the final word: “The pre-eminent mystery is why anything exists at all. What breathes life into the equations, and actualised them in a real cosmos? Such questions lie beyond science..they are the province of philosophers and theologians”.

If the President of the Royal Society says that science hasn't rendered religion redundant, then that's certainly good enough for me.