

Lecture delivered at St James' Finchampstead 10th February 2009

**DARWIN AND THE THEORY OF EVOLUTION.
DO SCIENCE AND CHRISTIANITY NEED TO BE IN CONFLICT?**

An examination of the perceived conflicts between science and religion with particular reference to evolution.

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I am very pleased to be with you this evening. Thank you Richard for inviting me.

Let me say, before we begin, that I think the most productive side of an evening like this can be the questions and discussion we have after I have spoken. I don't know what particularly interests and puzzles you about the debate between the claims of science and those of Christianity (and other religions). So hearing about your views and responding to your questions will be especially interesting to me and, I hope, valuable to you. So while I am talking, you will be thinking about any points you would like to make afterwards. These could be based on something I have said or they could be points which I have not covered. I would like to hear from you.

In all our beliefs and attitudes, although we have a great deal in common, we also have our own individual viewpoints; influenced by our own histories. So I will say a little about mine.

I first learnt about Evolution from Arthur Mee's 'Children's Encyclopaedia', which my parents bought for me and my sister when I was about 8. There were, I think, ten volumes, most of which had an article on a particular phase of evolution. I found it fascinating; not only the Dinosaurs!

My parents did not go to church, other than for marriages or funerals and Christianity came later. I learnt something at school, but it never made much impression, even though I was confirmed. We all were in those days in my school. It wasn't until I went to University that my friends there and a remarkable college chaplain, helped me to take Christianity seriously. I read Science (Natural History) for part 1 at Cambridge and, finding the teaching there rather boring, changed to History for part 2 of the Tripos. In my case my Science came before my Christianity, which I think made it easier for me.

After a short spell in industry I became a Chemistry teacher (school master) and that is when I first came across the confusion, amongst young people, between their understanding of science and of their religious beliefs. The School Chaplain at the school had discovered that I went to church so he asked me to teach some R.E. (Now usually known as Religious Studies). For this I had absolutely no qualifications but he said that didn't matter! The boys he wanted me to teach (in addition to my Chemistry of course) were aged about 13. What was I to do?

I hit on the idea of asking them to write short essays on "What I believe"; that is about their basic beliefs. This is what first showed me the confusion in young people's minds. "I believe that Science and not God made the world", wrote one boy, showing that he was as confused about Science as about Theism. "I have a schizophrenia between my religious beliefs and my understanding of Science" wrote another. Schizophrenia is a serious condition.

On a lighter note, boys can be quite bright. Over lunch a Headmaster said to the boy next to him, 'It was a miracle that you passed that exam'. The boy replied, 'May I pass you the wine'.

It was many years later when at Oxford that I met Professor John Hedley Brooke, Professor (at that time) of Science and Religion at Harris Manchester College, that I was able to make a contribution to that problem with the 'Science and Religion in Schools Project' for which you have the leaflets. I have brought some of our Guides for Secondary and Primary Schools. If you have contacts with schools as a teacher or governor, for instance, and would like a copy or copies of these Guides I would be pleased to let you have them. The object of the project is to encourage 'Open minded and informed discussion about the claims of Religions and those of Science'.

Now for the main part of what I want to say. I will start with a story I rather like.

A man was climbing up a steep path on a mountain, sheer cliffs one side, vertical drop the other, when round the corner appeared a lion. The man terrified went down on his knees to pray. To his amazement the lion went down on its knees to pray. "This is wonderful" said the man, "we both have the same faith"! "I wouldn't be too sure" replied the lion, "I am saying grace".

I like to think of this story as an allegory. Is 'Science' like an angry lion, an enemy which is about to eat Christians up? I want to tell you this evening why I think this is not the case.

First we must ask 'What is Science?' There is so much misunderstanding about this, not least amongst scientists.

Science is a method of investigating the natural world. It is built on evidence, but a particular sort of evidence, and on hypotheses and theories which are based on this evidence. Strictly speaking hypotheses and theories are not the same thing, but they are sometimes spoken of as if they were.

First, the evidence used in science, which as I said is a particular kind of evidence. I call it reproducible evidence, because the observations and experiments which produce this evidence must give consistent results the same in August in Australia as in November in New York. This is not to be compared with the normal evidence we come across in our daily lives much of which is 'unique' and cannot strictly speaking be reproduced. We often think we would like to repeat a particular personal experience but it will never be quite the same.

Science is also limited to time/space phenomena; so the concept of 'before' time/space is not meaningful to science.

On the basis of that evidence Scientists produce their theories which 'explain' (and I put that word in inverted commas) the observations. I read a nice simple example of the relationship between evidence and theories in the paper last week. It said that older female Orca (or 'Killer Whales') were better mothers than younger ones. The evidence for this was that more of their babies survived to adulthood. This evidence is 'reproducible' and you can check it out by making the observations again with another group of Orcas. The article went on to say that two theories (perhaps the article called them 'possible causes') might account for this. One was the 'attentive mother hypothesis' that the older whales had fewer and ultimately no more babies which gave them more time to look after their young. The other was that they had more maternal experience. How could we decide which hypothesis was correct? Or both? By getting more evidence of course. You could measure the time they were together. Observe the techniques that they use for looking after their young and see if they changed as the mother got older.

Another example of a scientific theory is Newton's famous Theory of Gravity. In Newton's time there was already a great deal of evidence about the movement of the planets round the sun and the moon round the earth as well as the movement of objects on earth. Newton's Law, you may remember from your school days, states that the 'force of gravity' by which matter is attracted to itself, is proportional to the masses of the pieces of matter concerned and inversely proportional to the square of the distance between them. This was an enormously successful theory which is still used today. It will get you to the moon and back – if you want to go! But, as happens to theories, it was succeeded nearly 200 years later by Einstein's Theory of Relativity which is a better predictor, particularly as an object travels at a speed near to the space of light. Now Einstein's Theory itself is being questioned.

To sum up, scientific evidence remains consistent (well usually – sometimes scientists get it wrong) but grows in quantity and accuracy. Scientific hypotheses and their theories are always liable to be changed or modified.

Now let's look at the theory of Evolution. Some people say "it's only a theory". But that is misleading. It is a theory based on a vast amount of evidence. What is this evidence?

- Radioactivity. The 'half- life' of radioactive elements in rocks and in bones allow us to date them. This evidence is reproducible.
- Genes. The chemical structure of genes shows us how all living creatures are inter-related and tells us something about how they are related through time. It has also been possible to recover some genetic material from fossilised materials. Reproducible.
- Geology. As well as radioactivity, the sedimentary layers and their fossils tell us much about the history of the earth. Reproducible.

And there is much more.

And what are the theories which are based on this evidence?

- That the universe is very old – about 13.7 billion years.

- That the earth is about 4.56 billion years old and early forms of life are thought to have started to appear about 100 million years later.

Denis Alexander has written an excellent book, which I strongly recommend, with the title 'Creation or Evolution – Do we have to choose?'. In it he describes how, if we look at the history of the earth as if it were a 24 hour clock starting at zero with the present time as midnight, then, simple forms of life would be appearing at 2.40am, single cell organisms flourishing by 5.20am. But single celled creatures with nuclei do not appear until around lunch time (a very long gap), multi cell organisms about 8.15pm. At 9.10pm, in an amazing 3 minutes, a great diversity of phyla appear (the Cambrian explosion). At 9.58pm the mass extinction of the Devonian period takes place and at 10.11pm reptiles appear, followed by the earliest mammals and dinosaurs at 10.50pm, and the first birds at 11.15pm. Just two minutes before midnight hominids start to appear and just 3 seconds before midnight humans make their entry. Recorded human history is one fifth of a second. The blinking of an eye! It puts things in perspective.

I doubt if these figures will change greatly. What is much less certain is how this process of evolution actually 'works'. Darwin's theory was essentially 'the survival of the fittest'. Not his phrase incidentally. That phrase was first mentioned by Herbert Spencer in his 'Principles of Biology' published in 1864. Darwin's 'On the Evolution of Species' was published, as we can hardly help knowing, 150 years ago in 1859.

In view of what I have said about theories changing, I was interested to see on the cover of a recent issue of the New Scientist (24th January 2009) the headline 'Darwin was wrong'. But don't get too excited. The article was actually called 'Uprooting Darwin's Trees' and showed how species do not evolve through a simple 'tree and branch' structure but sometimes through a sort of 'cross fertilization' between species. So the theory is modified.

As Keith Ward wrote recently in the Oxford Diocese publication 'The Door' (Feb 09), "We are only at the beginning of our understanding of the mechanisms of evolution and no-one should pretend that we know exactly how it all works".

There are other theories which may change. For instance there are some scientists who are advocating a 'Big Bounce' in replacement of the 'Big Bang'. This is the idea that the universe oscillates between expansion and contraction. There is little evidence to support this at present. But it is a possibility.

An interesting point is that some scientists are nervous about a universe that has the very special qualities, surprisingly precise you could say, that allows life at all and that has a beginning and, presumably an end. Could it be that this looks too much like a universe which has purpose or is even created by God?

A further hypothesis which appears to be a result of the nervousness that some scientists have about 'purpose' is that of the 'Multiverse'. This is the idea that there are an infinite number of universes and we just happen to be on the one which is 'fine tuned' for life.

By definition we cannot contact other universes, presumably in different time-space systems, so there is, and probably never can be, any evidence to support the idea. In my view this does not make it a valid scientific hypothesis. It's just another neat way of getting round the idea that our universe might possibly have purpose ingrained in it.

Thinking of the difference between an hypothesis and a theory, the OED describes an hypothesis as 'A provisional supposition which accounts for known facts and serves as a starting-point for further investigation by which it may be proved or disproved' (1646).

And a theory as 'A scheme or system of ideas or statements held as an explanation or account of a group of facts or phenomena' (1638). You can see why there is confusion.

In fact all scientific theories are in a sense hypotheses. The 'multiverse' hardly even justifies that term. Perhaps we should just call it an idea.

Back to Darwin for a moment. He was a remarkable man for whom I have a great respect.

Among other things he was a great collector of evidence. Even at school he collected beetles and on his famous Beagle voyage he filled much of the ship with specimens of creatures he discovered and fossils he found, to the irritation of the captain. From time to time during his five year voyage round the world from 1831 to 1836 (including his famous visit to the Galapagos Islands) he would send batches home.

He never stopped collecting but he also got others to collect for him. Three years after his return from the Beagle voyage(1831-1836) he married his cousin Emma Wedgwood. When they moved to Downe House he began to fill every garden shed, then half the rooms of the house with his enormous collection. It was as well that Emma had a great deal of patience. Their's was a rock solid marriage but marked by the tragedies of the early deaths of some of their children. The death of Annie at the age of ten in 1851 was the one that hit him

hardest. Some have said that it was responsible for his loss of faith, but it was not as simple as that. As is well known Darwin's father expected (wanted) him to go into the Church and that was his supposed intention when he was at Cambridge. But there is no evidence of great enthusiasm on Darwin's part and he had certainly changed his mind by the time he returned from his Beagle voyage. He wanted to devote his life to his biological interests. Fortunately for him he inherited enough money to enable him to do so without taking paid employment.

It is never easy to see into someone's inner mental and spiritual life. Darwin clearly had doubts about conventional 'theology of nature' during his 'voyaging' and was well aware of the controversial nature of the theory of 'the origin of the species' which was developing in his mind. It was this that delayed the publication of 'On the Origin of Species' until 1859. And he only published then because his younger friend Alfred Wallace had come to similar conclusions which he was about to make public. Darwin understandably wanted the credit he deserved.

As far as his faith was concerned, 1849 was a significant date. Before that he would accompany his wife (who was a devout Christian) and family to church on Sundays. After that he would leave them at the church door and go for a walk. Later in his life, he described himself as agnostic. Sometimes, he said, he was a theist, sometimes not. There have been rumours that he returned to Christianity late in his life. But these are without foundation.

Darwin was, incidentally not the originator of the idea of evolution. His grandfather, Erasmus Darwin(1731-1802) was an early evolutionist. See Janet Browne's excellent 2 volume biography 'Charles Darwin' published in 2005.

Of course the publication of 'On the Origin of Species' in 1859 had a considerable impact.

It is always remembered that senior church Bishops came out against it and that Disraeli, when he was a guest speaker at the Oxford Diocesan Conference in 1864, said 'Is man an ape or an angel? I am on the side of the angels.' But then he was a politician... What is not so well recognised is that some clergymen, notably Charles Kingsley, welcomed 'The Origin of Species' from the beginning, saying that he had no problems in accepting Darwin's theory.

Before turning from Science and Evolution to our reactions as Christians, I want to mention three ideas which are often associated with science and are supported by some scientists which I think are misleading and mistaken. I call them 'scientific heresies'.

The first is 'Scientism'. This is an extreme view, apparently supported by Richard Dawkins among others, and is associated with 'Materialism'. Dawkins wrote, I think in 'The God Delusion', but perhaps in one of his earlier books, that "only Science can provide us with reliable knowledge".

This elevates Science way beyond its strictly limited range into a fundamental belief system.

Dawkins is like a starving man in a desert saying that 'there is no such thing as food' and thinking he has solved the problem.

Scientism is a form of fundamentalism. 'Only Science'. This is nonsense of course. Alister McGrath points out in 'The Dawkins Delusion' (a book you must read if you read any of Dawkins' books) that this statement that only Science can provide reliable knowledge cannot itself be tested scientifically. End of Dawkins. Well, not quite.

Like other Fundamentalists, Richard Dawkins' beliefs are passionate and not based on clear philosophical thinking. We should have little difficulty in rejecting scientism. There is more to life than molecules. Fundamentalism can be defined as the belief that part of the truth is the whole truth.

The second heresy is similar – Reductionism, sometimes called 'nothing butt-ery'. You will have heard some scientists suggest that we are 'nothing but the cells we are made of', 'the brain is only a mass of neurons' or the Universe is 'nothing but a vast mass of subatomic particles'. The important point that I want to make here is that the whole is always, in nature, more than the sum of its parts. Always. Always.

Take your bicycle to pieces and lay them on the ground. These are the parts of which it is made, yes. But the parts on the ground are quite useless. Put them together and you have something different and useful. Obvious really.

The third heresy concerns 'chance'. We sometimes hear that evolution is a matter of 'pure chance'. In fact there is no such thing as 'pure chance' in nature. Chance in nature is always 'a mechanism acting within a context'. I sometimes use the example of chasing a chicken towards a fence which has just one escape hole in it. It will panic and run into the fence again and again until by 'chance' it gets through the hole. A dog, being more intelligent will look quickly up and down the fence and then dive through the hole. Many processes in nature are 'chicken like', but they are not pure chance. The chicken's behaviour can be said to be a mechanism (in this for solving the problem of escape) within a structure (in this case the fence with a hole in it) The idea of 'pure chance' in nature, like that of reductionism, is bad science.

I want to add something about the Arts here because I think they offer an interesting balance to the influence of Science in our thinking. You will see that it is relevant to our beliefs (faith?).

The Arts are essentially 'holistic'. You do not hear of anyone saying that Rembrandt's 'Night Watch' is 'nothing but' a mixture of pigments on a piece of canvas! Why not? Partly, no doubt, because we have always known, in this sense, about how pictures are painted. It is nothing new. By contrast the discovery by scientist of the bits we are made of is new, even startling. But it is more about the nature of art. It is the whole picture that counts. Of course a critic will analyse the picture, point out some of the details, say why he or she thinks it is so effective, tell us its history. But it is the whole picture, whole symphony, whole statue, that affects us. The fact is that reductionism and materialism are not really relevant in this area. The same is true of our religious beliefs.

So I am coming round to how Christians should respond to Modern Science. The first thing to remember is that we have been here before. This is not the first time that this sort of thing has happened. Augustine of Hippo pointed out in the 5th Century AD that Genesis 1 could not be taken literally. How can you have days and nights he said, when there is no sun and earth? He got away with that. But when Galileo, nearly 400 years ago, proposed that the earth rotated round the sun and not vice versa, he was lucky to escape with his life. The Church opposed his views vigorously and in those days it was the Church which was in power. Clearly some Christians felt that their faith was threatened. But which of us worries about that now? We have got used to the idea and have found that it does not affect our basic faith. My guess is that all this fuss over evolution will pass in due course. Meanwhile we have to clear our minds.

One option for us is to follow the 'Young earth creationists' and to dismiss the theory of evolution as simply wrong. It would not be an easy thing for us to do. What surprises me is that quite a number of people, especially for some reason in the USA really do take creationism very seriously. The movement even seems to be growing. Why? Well, there is a great satisfaction in simplicity. Just forget about Science and accept the literal truth of the Genesis story. Fundamentalism is attractive. Switch off your brain and relax. Another question:

Why is creationism popular now? Can it be that the literalism which is an essential part of Science has influenced the literalism of Christian Fundamentalists? They would not be pleased to hear this.

Although we may strongly disagree with Creationists we must respect their views.

They are often very devout Christians and that is what really matters.

I have not mentioned other faiths this evening. We know that Fundamentalism can be very dangerous whatever your faith. It is particularly so when religious Fundamentalism is linked with politics. Think of the Crusades. But I am not pursuing these thoughts this evening.

What about Intelligent Design? Advocates of Intelligent Design tend to accept the age of the universe but claim that the Evolutionary theory is incomplete (which it is) and unreliable (which, essentially, it is not). They point to parts of the theory which they say do not 'hold up' and claim that therefore, God must have directly intervened at various points in time. It might be easy to be attracted to this idea, especially if you are not a scientist. But I have to tell you that the supposed 'Science' (I put the word in inverted commas) quoted by enthusiasts for this view is bad science. Sadly, they seem to allow their enthusiasm to run away with them. I do not recommend that you allow yourself to be misled. Bad Science is always liable to be overcome by Better Science. Their case will fail.

So how should Christians respond to the theory of Evolution? I suggest that we should rejoice. Rejoice that God has given us the intelligence to seek to understand how His universe works. We have learnt that His creation was not conjured up by a 'flick of his finger', but rather by billions of years of painful as well as beautiful creativity. We find that it is vastly more complex than we could ever have imagined. And yet the problems remain.

Some of these problems will perhaps never be understood as we cannot truly and fully know the mind of God. Evolution is a bumpy ride, but it gets there.

Just as we experience pain and suffering as well as beauty and joy in our present lives, so we find that pain as well as beauty is present in the process of evolution. This pain challenges us.

How can a loving God also allow it, apparently as a fundamental part of the creative process.

It is a problem which will not go away. I recommend Christopher Southgate's recent book 'The Groaning of Creation'.

There is a cost to evolution, as there is a cost in everything we humans create. Why? We have no real answer. It is just there.

As far as our faith as Christians is concerned, we should be unaffected by, rather we should be enriched by, the progress of Science when it is properly understood. 'In the beginning was the word. And the word was with God, and the word was God'. The teaching of Jesus is in no way effected by Science. We should love God and love our neighbour as ourselves. God is love. Science has nothing to say about this.

What do we make of the miracles or the resurrection? Seen superficially these may seem to be events denied by Science. But remember that Science can only judge those events based on reproducible evidence. There is no way that we can do experiments on the Resurrection. It was and is a unique event. There is evidence for it yes, in our lives and in the history of the Church. But it is in no way reproducible in the way that evidence for scientific theories has to be. Belief in the Resurrection is a matter of faith not of Science.

The matter of miracles is similar, but different. Faith healing is well recognised but again outside the realm of experiment. Evidence is there but it cannot be reproduced in the laboratory. I have known examples of faith healing as I expect many of you have.

Remember that even Jesus could not heal where there was no faith. We should avoid falling into the trap of thinking that something we do not understand does not exist.

Mystery will always be an essential part of our faith.

Personally I am a firm believer in the power of prayer. Prayer changes us as well as those we pray for. It changes relationships. I know someone whom many of us prayed for when he was very seriously ill. He was never told that we were praying for him but when he recovered he said that he had felt those prayers. We do not understand how faith healing works, but it certainly does happen and some doctors recognise this.

I think that it is time to move towards discussion. Let me just sum up some of the points I have made. This does not mean that we should not discuss any other relevant points. There is a great deal I have not said.

I have asked 'what is Science?' and have discussed the importance of reproducible evidence and the way in which, by contrast, the theories which 'explain' that evidence are constantly changing.

I have talked about the theory of Evolution and the way that massive evidence, much of it observed since Darwin's time, supports it as a general thesis. But I have warned you that there is still a great deal about the way life evolved that we do not understand.

I have recommended 2 books (among many others):

Denis Alexander 'Creation and Evolution. Do we have to choose'?

Christopher Southgate 'The Groaning of Creation. God, Evolution and the Problem of Evil'.

The Dawkins Delusion' and indeed any other books by Alister McGrath.

I have spoken about Darwin himself and my great admiration for him. (Is it surprising that a man so obsessed by material evidence should become an agnostic?)

I have mentioned three 'scientific heresies' as I have called them:

Scientism (A form of Fundamentalism)

Reductionism. The whole is always more than the sum of the parts.

The role of chance in Science. Chance in nature is 'A mechanism acting within a context'.

I have talked about the Arts as a way of taking a step away from Science towards understanding the holistic nature of faith.

I have said something about past problems between Science and Christian faith. Augustine, Galileo.

I was critical of Intelligent Design.

I suggested that we should rejoice in God's creation, recognising the pain and suffering which appear to be an essential part of the creative process.

Science is not a lion which is seeking to devour us. Properly understood science can enrich our lives. But, however science advances, it can never challenge our faith nor the teaching of Jesus, and, as he showed us, accept suffering, love God, love our neighbour as ourselves and know that God is love. This will never be changed.

Never.