# A Scientist reflects on Creation and Faith

*A reflection given by John Galloway, Professor of Evolutionary Medicine at University College, London on October 10th at All Saints'*

Jo has mentioned that I teach Evolutionary Medicine at University College's Medical School in London. But she has just mentioned Richard Dawkins as well, so I'll start with him or at least with a nice story about him. I have known Richard for more than 40 years, since we were both Fellows of New College, Oxford in the 1970s. That was before he became the evangelical atheist that we know and love today. I was doing research in molecular biology. He had just been appointed University Lecturer in animal behaviour. In scientific circles the subject was known as 'Ethology'. It clearly wasn't a subject known to those who advertised the post. Richard actually applied for a job advertised as being in theology.

New College is, despite its name, hardly 'new'. It was founded in 1379 by William of Wykham, Bishop of Winchester. There is a little irony in the fact that a profoundly Christian foundation – it has among other things arguably the best church choir in the country - has been the home of such aggressive atheism. Point and counterpoint come to mind. In passing I ought perhaps to point out that there is rather good evidence that Christianity played an important part in providing the foundations of modern science in the centuries before what is referred to as the 'Scientific Revolution' of the 16th and 17th centuries. But that is a story for another day.

Life began with the first cells. The cell doctrine is biology's great contribution to knowledge. Knowing what we do, it is impossible to conceive of a life-form that is not cellular. Whatever its origin, it is the evolution of the cell that has made the world like it is – including us. But here are a few words from atheist, Francis Crick of double helix fame. "*The origin of life appears….to be almost a miracle, so many are the conditions which have had to be met to get it going.*"

Those conditions were no part of biology. The universe itself had been busy evolving before cells appeared on the scene. By the time those first cells appeared, the world was 2 billion years old and the universe around 12 billion. We only appeared about a million or so years ago. In terms of the universe we look like a bit of an afterthought. It appears though that life could not have emerged any sooner. The reason is that life depends absolutely on carbon with its talent for forming long-chain molecules. And carbon comes from? It is forged in the nuclear furnaces of stars. As are all the other 60 or so elements that life depends on.

It is rightly said that we are created from stardust. But that stardust was not around until stars had been born, lived and finally died in the colossal explosions of supernovae. Only then was there the elemental dust out in space ready to condense into planets. It all took time, and rather a lot of it. The fact that carbon is here at all is a bit fortuitous in itself. Only a quirk in the structure of its nucleus stops it from all being instantly turned into oxygen. This was so interesting a finding that astronomer, Sir Fred Hoyle, another rather aggressive atheist, remarked that the universe looked like "*a put up job*".

We can treat the universe as a matter of brute fact. It is here and it is like it is; full stop. Scientists spend their time (and your money) finding things out about it. One of the things they have found out is that its behaviour is determined by just four 'forces'. They are gravity, electromagnetic forces, and the strong and weak forces that operate in the atomic nucleus. But this knowledge leads

inexorably away from the facts themselves and into something much more speculative.

The universe is the way it is because these forces have exactly the strengths that scientists have measured. If any were weaker or stronger, if the balance between them were upset, the universe would be very different. Even the smallest differences and the universe would not have evolved in the way it has, including never creating stars. In which case there would be no life…and no-one to wonder at the universe and try to explain it; where it came from and why it is there at all. Science can explore these possibilities because it has mathematical models of the universe.

Before becoming interested in biology in Oxford, I was a theoretical physicist or, as my mother used to say, "…*more a theatrical physicist if you ask me*". Scientific knowledge is not so much facts as ideas and concepts, models and theories.

Theoretical physics uses maths to formulate its own models and theories. It's a way of working that has implications. The first is that its theories appear very abstract. Exactly what is the relationship of theory to reality? Does maths itself exist in the universe independently of human thought? Or is it only something we've invented?

Another implication is that for most people, mathematical theories are completely incomprehensible. They really can't be pictured. The ideas they represent are outside of our experience. They are a mystery in other words. It follows that when a theoretical physicist is explaining something to you, he or she tends to use parables. Think of the expanding universe as being like the surface of a balloon being blown up or imagine an atom as a sort of solar system. The aim is to put a picture in your mind of something that doesn't really have a picture.

Let me finish off with some reflections on the words 'belief' and 'faith'. The scientist in me is a bit uneasy with them. They seem to have been weakened by over- and sloppy use. They don't seem to convey the meaning we would like. The trouble with 'belief' is that it is actually rather a weak word these days. I 'believe' Nick Clegg has people's welfare at heart, really means I'll give him the benefit of the doubt for now but don't hold me to it. 'Belief' now has a conditionality about it. Why not have the courage of your convictions and use 'know'?

A scientist knows something because of their closeness to it, an observation, an experience, an experimental finding. And what about 'faith'? 'Faith School' has a lot to answer for. If we mean 'trust' why not say it? It is concrete and direct and it conveys the idea of a strong personal relationship. Isn't that what is wanted?

## Visit of Bishop Paul 26th September 2010