*MEETING OF THE PARLIAMENTARY AND SCIENTIFIC COMMITTEE ON MONDAY 23RD APRIL*

# Faith vs Fact – Evolution in the Classroom

*Dr Ian Gibson MP*

The debate over the way in which evolution is taught in schools is often seen as a microcosm for the 'battle' between religion and science. Arguments about the origin of man are viewed as being represented by the Darwinian school of thought on one side, boasting modernity and enlightenment, and some form of creationism on the other side, holding on to tradition and belief. Framing the debate in this way can however over simplify it and lead to a position where both sides are reduced to name calling. The focus must remain on how science is to be taught and what the best way is to produce students that are inquisitive and intellectually strong. In my experience the only way science can be taught to accomplish this aim is to use research and observation to come to a result that is verifiable and evidence based. Faith should not play a part in the scientific process. When we look at intelligent design it cannot be seen to pass the scientific test.

Ever since the publication of Darwin's masterpiece, the *Origin of Species*, many people of a religious disposition have sought to discredit evolutionary theory based not on scientific fact or research but based on their interpretation of creationism as written in the Bible. The debate about the scientific validity of evolution and alternative theories is not a new matter that has emerged with the coming of the so called 'intelligent design' theory. The bible belt of America saw one of the first major clashes over the teaching of evolution in schools. Dayton, Tennessee in 1925 saw the famous Scopes trial, which was built up as a clash between the forces of modernity and the forces of religion. Were children to be allowed to be taught science that contradicted the Bible and engaged them in new ideas, or were they to continue under a law that made the Bible "the yardstick to measure every man's intellect, to measure every man's intelligence, to measure every man's learning", as member of the defence counsel Clarence Darrow put it. Although the defendant, John Scopes, lost the trial, it was widely viewed as a victory for the Darwinian side as their arguments seemed to be the more powerful.

Despite such apparent victories for scientific endeavour as the Scopes trial, the 21st century continues to see those who wish to see the Bible as the foremost text for academic inquiry. Emmanuel College in Gateshead has been allowed to teach intelligent design in science lessons as a 'faith position' equal to that of the 'faith position' of evolution. To put these two theories on the same academic level seems somewhat absurd to most people in the scientific community. One position, namely evolution, is supported by vast amounts of evidence and research, while intelligent design is supported by none. Michael Behe, one of the most prominent exponents of intelligent design, testified in 2005 before a court in Dover, Pennsylvania, that no scientific evidence in support of the intelligent design hypothesis had been published in peer-reviewed scientific journals.

The pseudoscientific position of intelligent design, a term employed by the US National Science Teachers Association, could not be in starker contrast with Darwin's theory. Evolution, as currently taught, is based on evidence from a number of different scientific disciplines. It encompasses biology, chemistry, zoology and above all genetics, to bring together evidence and present it in a completely rational and coherent manner. Intelligent design simply does

not have the overwhelming weight of scientific evidence behind it that evolution does. On the debate between evolution and intelligent design The Royal Society has said that "intelligent design has far more in common with a religious belief in creationism than it has with science, which is based on evidence acquired through experiment and observation." Claims of supernatural intervention in the origin of life should not be taught as science as they cannot be tested by experiment and do not generate any predictions. When intelligent design, and other such supernatural based theories, are held up to the same scientific scrutiny as evolution we can see that the two should not be taught side by side.

Evolution should however, like other subjects in science, be allowed to be questioned and be made to demonstrate its validity. Even though there is overwhelming evidence to show that evolution can explain how the world around us came to be, students should be encouraged to question what the theory has to say and try and build on it. Proponents of intelligent design should not however use gaps in scientific knowledge in order to muddy the waters between positions of evidence and faith. Evolution is a difficult subject for young minds to understand and they should not be confused by misleading or inconclusive arguments against it. Sceptics of evolution point out that the process has not been observed and can therefore not be taught as a position based on fact. This is a shallow argument as evolution states that processes involving the changing of species happen over long periods of time. There is no one jump from a slug to a horse, but a long and gradual process of mutation and transformation, the climbing of 'Mount Improbable' as Richard Dawkins describes it, which results in new species, or sub-species, emerging. Mixing different areas of science together to cause confusion about evolution does not serve its detractors well. The second law of thermodynamics is said, by those who believe in design, to show that evolution by natural selection would be impossible. Such expressions have however not been backed by evidence based research. The University of Leeds, where Professor Andrew McIntosh, originator of McIntosh's Law of Thermodynamics, is based, have issued warnings against introducing faith-based arguments into science and have looked to distance themselves from such positions. The University could have been speaking for the whole academic community when it said that it "wishes to distance itself publicly from theories of creationism and so-called intelligent design which cannot be verified by evidence."

The ability of scientists never to settle for an answer that cannot be verified has seen advances in the original ideas expressed by Darwin. Due to progress in technology and the bringing together of ideas from various branches of science, we now have a remarkable amount of evidence to support his claims. Darwin's book, *The Descent of Man*, told us that man had evolved from an ape-like primate. Not until we unravelled the human genome were we able to see just how similar we are to other creatures. We now know that we share 98 per cent of our genetic make up with chimpanzees, which surely cannot be a coincidence of design. Looking at our DNA has told us things about ourselves that religion cannot seek to explain. Up to 97 per cent of our three billion DNA base pairs are non-functional. Why would an intelligent designer make such superfluous substances? Might this phenomenon be better explained as a relic of evolution?

Religion does have an important role to play in society but clearly does not have much to say on the matter of evolution. Not all scientists are of the anti-religious disposition of Professor Dawkins. Some of our most eminent scientists, such as Einstein and Lord Winston, express a feeling for some other sense of their being. Einstein stated in 1939 that "the knowledge of truth as such is wonderful, but it is so little capable of acting as a guide that it cannot prove even the justification and the value of the aspiration toward that very knowledge of truth. Here we face, therefore, the limits of the purely rational conception of our existence." Religion can have much to say in the way we try to live our lives and offer some guidance on how to be a moral person. Science really does not have much of a voice when it comes to explaining how people ought to live in order to be a better person. The truth that science offers us may be a truly wonderful and beautiful thing, but a purely rational concept of our existence does not go any way to explaining the feelings of faith that billions of people around the world feel in moments of crisis and doubt. These feelings of faith however should not be allowed to undermine a scientific process based on research, evidence and the ability to inquire to an uncertain end.

# Teaching Darwinism and Creationism in Schools: A Roman Catholic Perspective

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Andrew Dickenson White in his two volume work *A History of the Warfare of Science with Theology in Christendom* (1896) saw the whole of the history of science as a continual struggle against theology. In the area of anatomy he tells us that a "yet more serious stumbling-block, hindering the beginnings of modern medicine and surgery, was a theory regarding the unlawfulness of meddling with the bodies of the dead… Hence Tertullian denounced the anatomist Herophilus as a butcher, and St Augustine spoke of anatomists generally in similar terms." The complete text of this book is easily available on the internet and you can find this quotation about Tertullian calling Herophilus a butcher quoted a number of times.

It is worth pointing out, as the late Professor White conspicuously failed to do, that what Tertullian objected to was not dissection but vivisection. Tertullian learnt from the pagan writer, Celsus, that Herophilus had practiced vivisection on criminals and slaves, women as well as men, perhaps as many as 600 of them. Herophilus remains the father of anatomy, and made many discoveries, but if anatomy declined radically after him it was not because of religious objections so much as because of his methods. Tertullian said he treated men and women cruelly in order to unlock the secrets of nature, "he hated men that he might know" (*On the Soul* 11).

I start with this story because it strikes me that the supposed warfare of science and religion is a myth (See JH Brooke (1991) *Science and religion: some historical perspectives*; W Carroll (2005) "Galileo and the Myth of Heterodoxy," in JH Brooke and I Maclean (eds) *Heterodoxy in Early Modern Science and Religion*). It is a myth in the sense that it is not a credible hypothesis in the history of science, but also in the other sense of myth, an idea that can shape someone's world view, that influences how they see the past and how they act in the present. AD White was so fixated with blaming religion for the decline of anatomy that he was prepared to gloss over the six hundred slaves who were tortured to death in the name of knowledge. He was so keen to pin the blame that he did not stop to examine the facts.

What then, as a matter of fact, has been the Catholic Church's reaction to theories of evolution within the biological sciences? It may be surprising to some, but the answer seems to be that the Catholic Church has not been overly concerned about the issue. It has neither enthusiastically embraced it nor has it challenged the science of it. Where there has been concern about evolution it has largely been concern over the ideological misuse of evolution by social and political forces – by social Darwinians, neo-colonialists, racists and eugenicists.

In general the Catholic Church is much less concerned than some Christian traditions to defend what some call the 'literal' truth of the book of Genesis. There is a problem here with what we mean by the literal meaning – that is, with how we identify the literary form of the passage so as to know what its intended meaning is (See Pius XII (1943) *Divino Afflante Spiritu* – see also Vatican II (1965) *Dei Verbum* and the Pontifical Biblical Commission (1994) *The Interpretation of the Bible in the Church*). Certainly Catholics are not bound to believe in a six-day creation. Augustine of Hippo, perhaps the most influential theologian of the Latin Church, did not believe that the world

was created in six days, and he warned that it was "reckless and incompetent expounders of Holy Scripture" who interpreted the Bible as intending to teach natural science (Augustine *The Literal Meaning of Genesis* I.19).

It is significant that there is no cause célèbre in the Roman Catholic tradition to rival the Huxley-Wilberforce debate of 1860 or Scopes 'Monkey' Trial? of 1925. The closest analogy to this is probably the temporary silencing of Pierre Teilhard de Chardin, the Jesuit Palaeontologist in 1950. Yet he was disciplined not for embracing the scientific theory of evolution, but for the way he reinterpreted religious doctrines of sin and salvation, in the light of evolution. It is also worth pointing out that the writings of Teilhard de Chardin were deeply controversial among some scientists (see for example Peter Medawar's entertaining but intemperate review of The Phenomenon of Man). Pope Pius XII, in the letter that was interpreted as an attack on Teilhard de Chardin, in fact argued that academics were free to discuss the doctrine of evolution "in as far as it inquires into the origin of the human body as coming from pre-existent and living matter" (Pius XII (1950) *Humani Generis*).

On the fiftieth anniversary *Humani Generis* Pope John Paul II went further and said, "new findings lead us toward the recognition of evolution as more than an hypothesis. In fact it is remarkable that this theory has had progressively greater influence on the spirit of researchers, following a series of discoveries in different scholarly disciplines. The convergence in the results of these independent studies – which was neither planned nor sought – constitutes in itself a significant argument in favour of the theory" (John Paul II (2000) *Message To The Pontifical Academy Of Sciences: On Evolution*). This was reported in the press at the time as a U-turn, but in fact the doctrine of evolution had not been condemned by Pius XII or by any pope. Rather, the statement of John Paul II was no more or less than an acknowledgement of the place of evolutionary theology within the biological sciences. John Paul II did not quote, but might well have been aware of, the assertion of Theodosius Dobzhansky: "nothing in biology makes sense except in the light of evolution".

From a Catholic perspective, should Darwin's theories on the mechanism of evolution be taught in schools? Clearly, yes. Darwinian evolution is in fact taught in Roman Catholic Schools in England and Wales as part of the national curriculum, and, as far as I am aware, the teaching of evolution within biology lessons has never been an issue of dispute between the government and the Catholic Church in the history of state funded Catholic schooling in the United Kingdom from the Balfour Act of 1902 until the present.

Should alternatives to Darwin's theory be taught in School? Clearly contemporary disputes within the discipline of biology should be taught in schools, and there have been important developments in evolutionary theory in the hundred years or so since Darwin, not least in the field of genetics.

Should six-day-creationism or 'Intelligent Design' be taught in school? Six-day-creationism is, to my mind, utterly incredible, both from the perspective of scriptural interpretation and from the perspective of the natural sciences. Intelligent Design is not such an absurd theory, and there are a minority of Catholics who take it seriously. However, I think that, taken on face value, as science it is nowhere near sufficiently established to warrant attention at school age. It is also striking that the theory, inasmuch as it finds any adherents among scientists, seems to be held more frequently by mathematicians and engineers than by biologists. In addition, speaking as a theologian, Intelligent Design is problematic from the perspective of theology, for it seems to make divine creation too closely analogous to a physical process of making, and hence the creator too much like another creature.

What then is to be taught in relation to Intelligent Design? None of the alternatives are attractive:

1. Don't mention it: This allows adherents to claim victory by default and leaves the weak arguments in favour of Intelligent Design to go unanswered.

2. Mention it in order to criticise it and use it as a foil to explain well established biological science. This would be my favoured approach.

3. Mention it only in religious studies lessons. This means it is discussed but in a context of relative scientific ignorance.

On this basis I would accept the discussion of Intelligent Design within biology lessons, though I should make clear that here I speak simply as an individual not for the Catholic Church as a whole. As far as I am aware, in many state schools (Catholic and secular), children are exposed to the 'creation-evolution' debate only in religious studies lessons, and hence in isolation from the teaching of science itself. This, which is the present default position, does not seem to me an entirely healthy state of affairs.

# True Science and Origins

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## The trouble with Truth

To tell the truth is dangerous. To listen to it is enraging. *(Danish Proverb)*

Andrei Sakharov (1921-1989) invented the Soviet nuclear bomb and then became a Russian peace activist until his death in 1989. He received the Nobel Peace Prize in 1975 (via his wife, as he was not allowed to leave Gorky). In his last speech before he died, he said, "I spent my whole life believing that the most powerful weapon in the world is the atomic bomb; Now I believe I was wrong. The most powerful weapon in the world is the truth." *(Quoted in Ravi Zacharias 'Recapture the Wonder', Nelson, 2003).*

The Royal Society has the motto *'Nullius in verba'* – on the words of no-one. There is a great danger that we infringe the spirit of free enquiry and even freedom of speech, if we insist that in the sciences that only one philosophical view of the evidence is allowed – Evolution. This raises the question just what is science and how should it be practised?

## Truth and Science

What is science and how should we do our science? Experimental science and science based on naturalistic philosophy can be, and often are today, two different things. We have the same evidence to look at – same fossils, same rock, same plants, animals etc, and yet we can come to very different conclusions. The reason is because of the different starting points. We need to be aware of three issues as we approach scientific enquiry.

**1 Ontological – What is reality?**

Naturalistic science postulates: What ultimately exists is physical matter/energy and nothing else.

However the more enlightened scientist knows that true science is limited. It cannot deal with the whole of reality. Scientific methods deal with measurable quantities, but cannot objectively give the basis of thinking and rational thought itself. That is science cannot answer the very foundation on which science is based – reason and rationality. C S Lewis many years ago showed the absurdity of the materialist who argues that all is matter and energy (see C S Lewis *Miracles*). Will and rationality cannot be reduced to a mere dependent chain of events. If we could find for all thoughts a reason for why someone thought the way they did, then the very basis of rationality and reason would be lost. Lewis has long been forgotten, but we do well to remember that reason and logic rely on something beyond matter and energy.

**2 Epistemological – How do we know what we know, and understand the Universe?**

Naturalistic science (methodological naturalism) proposes: Everything that occurs in the universe can, in principle, be completely explained by reference solely to physical laws.

In this way, the naturalistic scientist is forced to conclude that there is nothing outside what the physical laws can interpret – but that of course is simply a product of his naturalistic assumptions. But the true historical basis of science is in fact from another perspective. That is, the Universe exists in such a way that it is able to be examined and understood, and furthermore that there is evidence of it being constructed by intelligence.

It is not information from mindless matter arranged in a particular order, but matter coming from information/intelligence. This resonates with a large body of scientists who, whether religious or not, do not wish that secularism acts as a religion that will allow no rival. It is this that is behind the whole issue today. Secularisation must not be a religion which stifles truth.

It is important to realise that Intelligent Design is not a new theory

*Truth in Science is an organisation set up to promote scientific enquiry, where rigorous testing of scientific views on origins is encouraged: www.truthinscience.org.uk

of origins – it was held by all the greats of the past – Boyle, Maxwell, Faraday, Newton, Einstein. It is not a presuppositional view of truth, but rather a natural, evidentialist conclusion from scientists across the religious spectrum.

The alternative, methodological naturalism, cannot deal with the underlying issues of what matter, knowledge, rationality and mind really are, because by definition *mind is not transcendent in this paradigm*.

**3 Methodological – How do we do our science?**

Naturalistic science states: Adequate scientific explanations of occurring events and phenomena should, in the last analysis (including origins), only refer to physical entities and laws.

The humbler approach of a scientist is surely to consider that if intelligence is needed to understand the world around him or her, then this is due to rationality and intelligence being behind the natural order.

Even if Intelligent Design is incorrect, Sakharov shows that there should always be open discussion in finding truth: "Profound insights arise only in debate, with a possibility of counterargument, only when there is a possibility of expressing not only correct ideas but also dubious ideas." (*Andrei Sakharov 'Progress, Coexistence and Intellectual Freedom', 1968*)

Freedom of paradigm is essential in understanding science, and science itself is at great risk if we impose evolution with no critical appraisal in our schools and Universities. This is already being done with disastrous results. We need to teach our young people not what to think so much as how to think – independently. *'Nullius in verba'* must be maintained.

To a growing body of scientists, the design position is scientifically, and intellectually, the most satisfying.

## Intelligent Design is the best scientific paradigm to understand natural mechanisms

Examples of mechanisms abound. Both living creatures today, as well as fossilised remains even from Cambrian rocks (for instance the double calcite lenses in some trilobites of the Cambrian – Fig 1), indicate remarkable and intricate mechanisms with no evidence of simpler precursors. Other examples from flight in nature are the bird feather (Fig 2, see next page) which involves an intricate hook and ridge structure which only becomes evident under the microscope, and the avian lung whose operation is unique and completely different in operation to mammals and reptiles, the latter of which are supposed to be birds' ancestors according to evolution. Any transition is lethal and respiration in a supposed transition is impossible.

## The science of information and thermodynamics

But at the fundamental level the reason evolution will not work is because of thermodynamics and information.

The laws of thermodynamics have one law in particular—the Second Law of Thermodynamics – which says that in a closed system the amount of energy that is no longer available for useful work is increasing. This is energy 'lost' to the system per unit degree of temperature, and it is called the entropy of the system. The principle of energy loss for doing useful work still applies in an open system, since unless there is a machine to use the energy added, there is no benefit. Boeing 777s cannot be made in a car factory by adding loads of sunlight or electricity unless the machinery is available to use that energy to build Boeing 777s. Similarly the human brain cannot be formed from simpler machines just by adding energy if there is no machinery

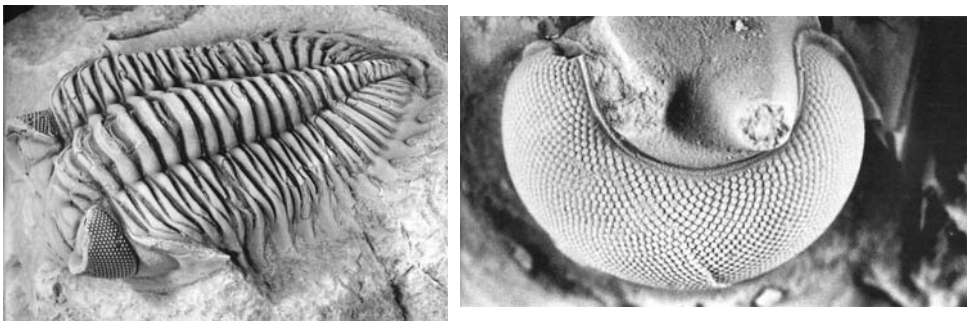
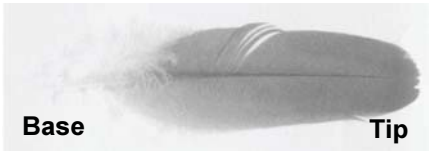
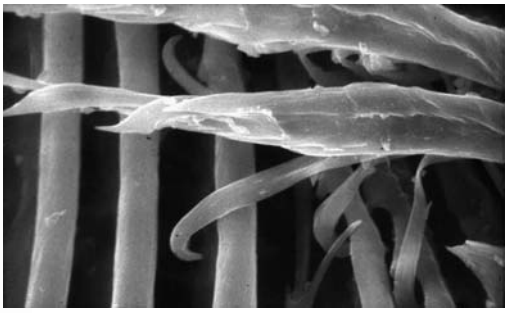


Fig. 1 Trilobites had very advanced visual systems. With compound eyes (made up of many lenses of calcium carbonate), they had special corrective features to avoid a double image. Some had corrective double lenses with the upper lens purposely 180° out of phase. These most complex lenses are in the Cambrian (conventionally dated as 450-500M years ago), and at the start of the phanerozoic era.




Pigeon Secondary



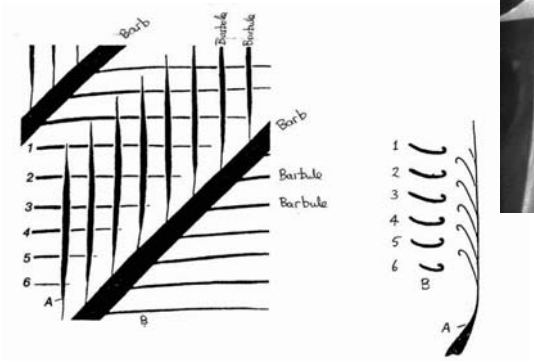



Fig. 2 Bird feather construction showing hook and barbule construction

available to do this. The spontaneous formation of such machinery will not happen.

Evolution proposes that new machinery arises of itself with no mind behind it. This idea is frankly thermodynamically absurd.

Experimentally, this has not been observed and is contrary to all the thermodynamic principles of energy transfer.

Furthermore new machines are not made by simply adding energy to existing machines. **Intelligence is always needed.**

Careful experimental science does not support 'just so' attempts to get round the clear evidence of design in nature. At the very least these matters should be critically considered in science teaching today, both in secondary and tertiary institutions.

## *In discussion the following points were made:*

Although the Second Law of Thermodynamics had been advanced to justify the argument that evolution can only ever generate small-scale changes in plants and animals and can never be considered responsible for major changes in biota, the contrary view was expressed that it did not actually apply to evolution, which is an open biological system where mutations can occur. So it is not clear where thermodynamics fits into that model. The second law says that everything is running down. If you add energy to an open system it does not change anything unless there is machinery there which is able to capture the extra energy, requiring functional complexity which implies a designer. An open debate is therefore requested.

One suggestion that has been made is that the complexity of life is such that it could not possibly have happened by natural selection. That is not a scientific comment. It is a philosophical or religious assertion. Darwinism has been tested although Darwin never really tested it himself. He wrote the *Origin of Species* and then speculated about how complex structures in biology could have occurred. We have a responsibility to teach what is sustainable in science and Darwin is sustainable. On the other hand, Intelligent Design is a belief, and one is entitled to it, but we should not teach it in science.

The wide range of views between Biblical fundamentalists on the one hand and Richard Dawkins on the other tends to dominate the scene, whereas as a Christian one has no trouble adopting an intermediate position. Neo-Darwinists insist this has all happened through chance alone. However, a Christian may find that insufficient explanation for the world as we find it. For example, how does one explain the coming into existence of DNA?

However, this esoteric discussion is missing the point that the main concern must be that children in school are not being given a sound grounding in proven science such as Darwinism and alternative unproven theories are being advanced instead in the very limited time available for science teaching. People are perfectly at liberty to believe in and promote alternative theories, but their discussion should not form part of the core study of proven scientific facts in the school curriculum.