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# Science Education and Religion in the post-Darwin era: an historical perspective

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**ABSTRACT** This article is part of the author's current research into science teachers' perspectives on the theory of evolution and its teaching in the classroom. Anti-evolutionary views have recently become very prominent in the context of science education, with almost one third of science teachers in the United Kingdom agreeing that creationism should be taught alongside evolution in the science classroom. However, these are not new views. Indeed, they have been around since the publication of Charles Darwin's *Origin of Species* in 1859. The article focuses on the main anti-evolutionary movements which arose in the 20th century such as the ideas leading to the Scopes Trial, Flood Geology and Neo-creationism. It analyses the reasons for the emergence of these movements with the aim of understanding the conditions which motivate the development of fundamentalist religious ideas. Conclusions are drawn about why this debate still persists today and about the impact this has had on science education. One might ask: 'Why are the polar ends of the spectrum so prominent in the public arena?'

## **Introduction**

The science and religion debate on evolution is not so much about biological evolution but more about politics and morality. In order to understand the phenomenon of anti-evolution today, one must look historically at the development of creationist ideas in Protestant Christian America. There were three key elements: the development of Fundamentalism, Creation Science and Intelligent Design. It is these ideas that have shaped the voice of the current anti-evolution debate and the religious responses to evolution that exist in the world today. It can be argued that it is ultimately a lack of education and

incorrect notions about evolution that lead to the religious view that evolution is evil, amoral and must be rejected. This article seeks to outline a historical perspective on religion and science post-Darwin and draw some conclusions for the future.

### **Darwin's Ideas and Spencerian Philosophy**

The *Origin of Species* by Charles Darwin was published in 1859. This book was the product of over twenty years' work, with Darwin focusing on his theory of natural selection that arose from his observations on the voyage of the ship *Beagle* as an amateur naturalist. This voyage took him to South America and the Galapagos Islands where he was able to observe both a vast array of wildlife and interesting geological rock formations. Darwin was not the only one who came up with the theory of natural selection, but he was pushed to publish his findings when Alfred Wallace sent him a copy of his own work, which was very similar to the work Darwin himself had done. However, it was Darwin's enormous quantity of evidence that gave him the edge over Wallace. Darwin had been greatly influenced in his Cambridge years by his friends including Adam Sedgwick and Charles Lyell who were two leading geologists of this time. Lyell wrote *The Principles of Geology*, a book which Darwin read and was fascinated by. In this book Lyell discussed the age of rocks and argued that rocks changed over long periods of time which could be evidenced by rock formations. Darwin was fortunate enough to observe this for himself on the voyage of the *Beagle*. This helped to shape Darwin's idea of species changing over long time periods.

Darwin's idea was not well received by all in the UK because it challenged the dominant religious idea that humans had been created by God in His own image and that the rest of the living world was separate from humans. Acknowledging that humans were organisms that had developed through changes over time meant this idea had to be re-thought. Although Darwin barely made reference to 'man' except to say 'light will be thrown on the origin of man and his history', it was obvious that Darwin's general conclusions were incompatible with Christian doctrine (Huxley & Kettlewell, 1965).

In the United States the concept of natural selection was initially fairly well received. Along with the advances made in Biology, the foundations of Sociology (the study of human society and social relations) were being developed. The Englishman Herbert Spencer (1820-1903) published a very influential book called *The Study of Sociology* (published in America in 1872-73) which shaped the ideas of American sociologists including Ward and Sumner (Hofstadter, 1955). Spencer thought Darwin's ideas of biological evolution could be applied to his ideas of social evolution. This transference of idea from one discipline to another was not new. Darwin himself had had the idea for competition as the mechanism which drives evolution partly from reading Thomas Malthus' *An Essay on the Principles of Population* in 1838. Malthus had observed the miserable social conditions of the nineteenth century and came up

with the idea that population growth was geometric but would always be checked by food supply.

As Darwin did, Spencer drew upon the ideas of Malthus having the view that the pressure of subsistence upon the human population would have a beneficial effect upon the human race. He thought that the powers of the human race would become greater as weak humans failed to survive and that eventually the 'ideal man' would be developed. He wrote about these ideas six years before the *Origin of Species* in two papers and developed his findings further in his book *Synthetic Philosophy: First Principles* (1864). Darwin's theory of natural selection only fortified Spencer's view that the state should not intervene but let nature run its course. He felt that state intervention interfered with the 'normal course of social evolution' whereby those who were 'unfit' should rightly be eliminated. These were essentially ultra-conservative ideas. At this time it was widely thought that social groups were different because of nature and that some cultures were just barbarous. Darwin himself states in the *Descent of Man* 'At some future period not very distant as measured by centuries, the civilized races of man will almost certainly exterminate and replace the savage races throughout the world. At the same time the anthropomorphous apes...will no doubt be exterminated. The break between man and his nearest allies will then be wider, for it will intervene between man in a more civilized state, as we may hope, even than the Caucasian, and some ape as low as the baboon, instead of as now between the Negro or Australian and the gorilla' (Chapter 6). It is important to note that the advances made in genetics have wiped out the idea that races are distinctly different from one another as previously thought in Darwin's time.

The idea of 'the survival of the fittest', which Spencer not Darwin coined, is transferable from Economics to Biology to Sociology. America was growing fast and with, as Hofstadter (1955) puts it, 'its rapid expansion, its exploitative methods, its desperate competition, and its peremptory rejection of failure, post-bellum America was like a vast human caricature of the Darwinian struggle for existence and the survival of the fittest'. After the American Civil War, the USA was ready to take on Herbert Spencer's ideas. The ideas of Herbert Spencer were opposed by the initial fundamentalist movement and would be used to fuel ideas against evolution.

### **Fundamentalism and Anti-Evolutionism**

The Christian Fundamentalist Movement in the United States has had the biggest impact to date on anti-evolutionism. Approximately 50% of Americans are Protestants of various denominations and 24% are Catholics (ARIS, 2001). Protestant Christianity developed after the Reformation in the 16th century. The schism of the Church was a battle between Catholic tradition and the Protestant view of the Bible being the ultimate source of Authority. Early theologians accepted that there was a contradiction between Genesis 1 and Genesis 2 and even St Augustine thought that the authors of Genesis were

trying to explain creation simply through story as it was too complex to comprehend (an argument still applied to the formation of the universe by theologians). For the early Church Fathers, God was ever present in all creation. It was Calvin and Luther who opened the floodgates to interpreting Genesis and other Bible stories as historical and literal.

This change led to the growth of many branches of Protestant Christianity as the Bible can be interpreted differently by different people – examples include Presbyterian, Baptist and Methodist Churches. By 1900, the major Protestant denominations had more than tripled from 5 to 16 million. There was a move away from the more traditional Protestant values to a more liberal or modern form of Protestant theology. The Conservative Religious Right responded with a series of booklets called ‘The Fundamentals’ (Marsden, 1991). These were published between 1910 and 1915 and covered a range of topics such as scriptural authority, sin and salvation. The leaflet entitled ‘The Doctrinal Value of the First Chapters of Genesis’ made its stance on evolution clear:

Man was created, not evolved. That is, he did not come from protoplasmic mud-mass, or sea ooze bathybian, or by descent from fish or frog, or horse, or ape; but at once, direct, full made, did man come forth from God. When you read what some writers, professedly religious, say about man and his bestial origin your shoulders unconsciously droop; your head hangs down; your heart feels sick. Your self-respect has received a blow. When you read Genesis, your shoulders straighten, your chest emerges. You feel proud to be that thing called man. Up goes your heart, and up goes your head. The Bible stands openly against the evolutionary development of man, and his gradual ascent through indefinite aeons from the animal . . . . . the Bible does stand plainly against that garish theory that all species, vegetable or animal, have originated through evolution from lower forms through long natural processes. The materialistic form of this theory to the Christian is most offensive. (p. 82).

The fundamentalists were against evolution but they were also opposed to liberal Christianity. This is a contradiction in some sense as fundamentalist views go against the earlier traditional theological works. The Presbyterian Church established five fundamentals – Inerrancy of Scripture (Bible is totally without error), Virgin Birth, Substitutionary Atonement (Jesus died willingly on the cross for our sins), Miracle-working power and the Body resurrection of Christ (Longfield, 2000). In 1922, most evangelicals argued that they needed to fight for their faith if they did not want unbelief to win. This idea is still around today with Jesus camps for children talking about ‘the war with science’. This ability to move people to action might be one of the reasons why America’s religious observance has a ‘remarkable tenacity and vitality’ (Boyer, 2001, p. 546) compared with the situation in the UK and Eastern Europe.

The 1920s saw the rise in the defence of the fundamentalist view of the Bible and arguments against evolution. Harry Rimmer (1890-1952) was one of the most prominent defenders. He resembled his contemporary creationists as he held the view that American colleges encouraged atheism and that the innocent youth could not defend their faith from scholarly assaults (Davis, 1995). This marked the start of the war on both modern science and science education. The famous Scopes Trial of 1925 in Dayton, Tennessee exemplified the religious responses to evolution at this time. A young biology teacher, named John Scopes taught the *Origin of Species* to his class. By doing so he violated state law and was put on trial. His defender was an agnostic called Clarence Darrow (who had read Spencer's work). The prosecutor was William Jennings Bryan who was a fundamentalist leader, a Presbyterian elder and crusader against the theory of evolution (Longfield, 2000). He was convinced that the theory of evolution undercut both the authority of the Bible and also moral authority – he was an interesting figure as although he was a religious conservative he was also a devoted socialist and reformer. Bryan believed that government was man-made and as such it could be improved. Most fundamentalists did not share Bryan's concern for the social implications of his faith (which he thought of as applied Christianity). 'As early as 1905 he saw the detrimental effect of social Darwinism on reform and progressivism' (Smith, 2009, p. 59). Bryan viewed evolution restrictedly in terms of Herbert Spencer's 'survival of the fittest' and hated the implications of social Darwinism. As a result he fought evolution in public schools. Although Bryan was not a believer in young-earth creationism and actually thought the Earth was old, he brought the issue of evolution onto the Presbyterian agenda. Before Bryan most Presbyterians were willing to accept evolution.

The Scopes Trial was played out in the press with about 150 reporters. Scopes was convicted but the verdict was overturned on a technicality. During the trial Clarence Darrow questioned Bryan about the age of the Earth and Bryan refused to say the Earth was 6004 years old. This upset many of his fellow fundamentalists as they wanted him to acknowledge that one day in the Bible is definitively 24 hours. Darrow also asked Bryan many questions about geology, comparative religions and ancient history exposing his lack of knowledge on these subjects (Longfield, 2000). The Scopes Trial actually damaged the fundamentalist movement of the Presbyterian Church which seemed to fade away during the 1930s. This was not in fact the case. Fundamentalism actually began to take on its own separate existence from the older churches and by the 1950s the evangelicals began leading a revival of popular interest (Carpenter, 1980). The Evangelical Movement consisted of a mixture of denominations but one of them was rightly called a fundamentalist movement consisting mainly of Presbyterians, Baptist and other independents. Carpenter (1980) states that 'the fundamentalist movement was not in decline but rather there was a shift in emphasis' which consequently paved the way for Creation Science.

## Creation Science

When science and the Bible differ, science  
has obviously misinterpreted its data.  
(Henry Morris, Institute for Creation Research)

Creation Science developed from the fundamentalist movement as it was a response to counter evolution. The original idea for using the Bible as a document to calculate the age of Earth was developed by James Usher, a protestant priest, in the 17th century. He based his calculations upon the twenty-one generations in the Old Testament originating with Adam and Eve. The Old Testament gives the ages of how long people lived and the age they were when the next generation started. For example, in Chapter 5, verse 3 it tells us how old Adam was when he had a son 'And Adam lived an hundred and thirty years, and begat a son in his own likeness, after his image and called him Seth' and also in verse 5 tells us how long Adam lived 'And all the days that Adam lived were nine hundred and thirty years and then he died' By adding all these dates up together, the date of the beginning of creation could be worked out and Usher got the date to be 23rd October 4004BC which was made public in 1650. It is hard to believe that these ages of men could be taken as historically accurate. Linder (2004) comments that 'Adam's great-great-great-great-great grandson Methuselah claims the longevity record, living to 969 years old'. Because of this calculation, the stage was set for disagreements between religion and science – particularly with regard to evolutionary theory which suggested the Earth was very old and some organisms had lived millions of years ago.

The next step was taken by George Macready Price who was the first person to attempt to draw together the many events that took place in Earth's history with the catastrophe stories proposed in the Bible. He attributed the entire fossil record to the Flood on the basis that the biblical account of Noah's Flood in Genesis 6-8 was historically accurate and that the date of the Flood could be traced back to 2348BC (Heaton, 2008). The Flood also provided an argument for the preservation of fossils. This argument not only undid 100 years of science but 2000 years of theology.

By the 1960s evolution had made a comeback in schools in America as the space race with Russia emphasised the utilitarian need to produce a supply of scientists and therefore educate young Americans about science. The 1960s was also a time when the Conservative Right felt a restoration of moral order was needed. That caused a religious response driven by social forces, not by scientific reasoning. The main instigator was Henry Morris a prolific writer about Creation Science. In 1961 Morris & Whitcomb published a book called *The Genesis Flood* which stated that the fossil record had got mixed up during the Flood and that, as previously calculated, the world was 6004 years old and all organisms has been created at the same time. The argument about the Earth being 6004 years old was not new but this was the first time it was presented as Creation Science and as an anti-evolution response. Morris & Whitcomb

attributed the fossil zones to the sequence in which species died in the flood waters (Heaton, 2008). Morris tried very hard to get Creation Science into schools but to no avail. He set up the Institute for Creation Research which still flourishes today (ICR). The biggest problem young-earth creationists have is time – there is a huge amount of Earth history to pack into 6000 years. Modern day creation research looks at ways to account for this and very sophisticated methods are used by well qualified scientists to try to explain their scientific findings within a young-earth framework. Heaton (2008) states that for young-earth creationists ‘scripture holds the ultimate authority and scientific data must be interpreted within those constraints’. He goes on to discuss that although the Flood has also been used to account for the Earth’s crust and Ice Ages, when reading Genesis, the Flood does not come across as the major catastrophe it is now portrayed to be. Would a wooden arc have been sufficient as a protector against such a major event?

### **Neo-creation and Intelligent Design**

Intelligent Design was an attempt to elevate Creation Science doctrine to the level of science. The Creation Science Movement had not been successful in infiltrating mainstream public school science classrooms and Intelligent Design was an attempt to get an equal standing with evolution. In 1987 the idea of Intelligent Design was proposed which essentially was the idea William Paley had posed in his book *Natural Theology* in 1802. He described the famous watch analogy and said if you found a watch lying on the ground and examined it you would come to the conclusion that it must have been designed due to its intricate working. Intelligent Design is the hypothesis that in order to explain life, one must suppose that it is the action of an unevolved intelligence. Although the hypothesis does not imply that one must believe in the existence of God, most supporters are theists. Intelligent Design theorists believe that life exists due to more than just natural causes and that an intelligence is needed to bring about the range of organisms which exist today (Demski & Ruse, 2006).

They argue that in the living world there is irreducible complexity, and organisms appear to have been designed because they really are designed (Meyer, 2005). Gaps in the evolutionary evidence are looked for and it is inferred from these gaps that many biological components (e.g. flagellum) are just too complicated to have functioned without all their parts intact, and that thus they could not have evolved. The Intelligent Design debate is written using scientific jargon and on the surface looks very plausible. There is just one problem – that is not how science is done: just because one theory is flawed it does not mean that automatically another explanation must be correct. The American Association for the Advancement of Science has declared that Intelligent Design is not a science. This, however, is very significant in the debate, as there are many supporters of Intelligent Design. Demski & Ruse (2006) have commented in their book *Debating Design* that there is a very real

chance that Intelligent Design might end up being taught in some science classrooms.

There are now other ideas surfacing, for example, the super-evolution argument – that God intervenes at particular stages of evolutionary history. This would account for the sudden spurts of biological diversification at specific geological time such as the Cambrian explosion (0.5 billion years ago) when the major groups (phyla) of present-day organisms appeared along with many others which became extinct. Creationists modify this argument to fit into a 6000 year time scale. One has to ask, however, why this same God would not then intervene during a natural disaster such as the Pakistani Earthquake where millions of innocent children were killed. Philosophically, this argument does not stand up. If the Judeo-Christian God is omnipotent, omniscient and benevolent he would surely not behave in this manner.

### Conclusions

This article has not been about criticising religion as people have the right to their faith. However, Creation Science is misleading the public about evolution and presenting alternatives to science that are simply not science. Using the Bible as a framework for scientific enquiry goes against the nature of science because scientists do not work backwards from a fixed conclusion. Creation science not only discredits science but it also can be damaging to theology. The creationist view is not tangible as there are too many areas of science you would have to disregard. A scientific theory should not be embroiled in religious literature like this. The anti-evolutionary movement is about the fear that through science we may lose our morals. The rise of creation science is in part due the rise in liberal theology and the horror of social Darwinism. Creationists use social Darwinism as evidence for the evil of evolution. Creation science needs to be challenged – a CBS poll in 2004 showed that 55% Americans do not believe in evolution which is a staggering statistic. I think the challenge faced today also comes from the fundamentalist atheists who tend to aggravate the conservative Christian right. There needs to be a middle ground, and liberal churches need to speak out over their acceptance of evolution. Extreme views can be damaging to an equitable society because many people with extreme views tend to be intolerant towards the views of the rest of society. For many creationists, evolution is the route to many other things they are against such as abortion and homosexuality.

Young people have the right to access correct information and to be allowed to make their own decisions using the skills they acquire through education. The world-wide web gives people more access to information that is often biased and very misleading. For example, *Conservapedia* (the creationist response to *Wikipedia*) refers to evolution as ‘atheist’ evolution (<http://www.conservapedia.com/Evolution>). Using this sort of language ties a religious standpoint to a scientific theory in order to encourage believers not to accept evolution.



There are no signs that the creationist movement is dwindling. In fact, much of literature has infiltrated into other religions. The Islamic Creationist Scientific Research Foundation has been set up in Turkey and they have produced an 'Atlas of Creation' argues against evolution and refutes the science. For example, it is strongly argued that birds could not have evolved from dinosaurs. This is made readily available to all and takes just a few minutes to download (Yahya, 2009). It seems reasonable to conclude that if the number of young people rejecting ideas such as the evolution of birds from dinosaurs begins to increase then the education system is failing our young people. The teaching of evolution needs to be more up-to-date and the focus needs to be on human evolution. The way we use terms like theory and origins needs to be made clear to pupils and we need to ensure that the teachers teaching don't come to the classroom with their own misconceptions. The problems of creation science need to be taught in schools as does the history of this debate. Science and religion are not interdependent but rather as science advances they ask some overlapping questions? For example, science is now starting to ask 'What was there before the big bang?', 'Does being religious have any socio-biological benefit?' and 'Is there a religious gene?' However, science does not have to be incompatible with the idea of a God. We do not know for sure if there is design in the universe but ironically God gets lost in attempts to make what is written in the Bible scientific. There are not just two clear cut choices to be made – an acceptance of evolution does not have to mean a rejection of faith. I believe that there is nothing more important than teaching young people about themselves and where they came from. Through good quality education and continued evolutionary research this pseudo-science of creation will be forced to eventually accept the scientific ideas of today and the future.

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