

Creationism, intelligent design and science education

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ABSTRACT Science teachers may currently find questions about creationism and intelligent design being raised in science lessons. In 2007 the UK Government's Department for Children, Schools and Families published some guidance on these matters, followed almost immediately by a resolution of the Parliamentary Assembly of the Council of Europe. It therefore seems appropriate, especially in view of the 200th anniversary of Charles Darwin's birth, to examine the meanings of these terms and how they differ from traditional beliefs in creation and design. This article is offered for science teachers who may be unfamiliar with the ideas involved, but would like, briefly, to be able to tease out what is at issue for science education.

Matters of concern

There has been disquiet expressed in the media, the education profession and in various scholarly publications about what are termed 'creationism' and 'intelligent design' (ID). The UK Government's Department for Children, Schools and Families has responded to public concern by issuing its *Guidance on the place of creationism and intelligent design in science lessons* (DCSF, 2007). The Parliamentary Assembly of the Council of Europe has also expressed its concerns for science education in a resolution entitled *The dangers of creationism in education* (PACE, 2007). Being a resolution, rather than a recommendation, it does not call upon member states to agree binding action. It starts:

1. The aim of this report is not to question or to fight a belief – the right to freedom of belief does not permit that. The aim is to warn against certain tendencies to pass off a belief as science. It is necessary to separate belief from science. It is not a matter of antagonism. Science and belief must be able to coexist.

The word 'belief' could perhaps have been sharpened up a little. It appears to refer primarily to religious beliefs and world-views, rather than the beliefs in human rationality, orderliness and the intelligibility of the universe that underpin the scientific enterprise.

Terminology

Two beliefs that are shared by the Abrahamic religions – Christianity, Islam and Judaism – as well as by others, are:

- There is a God who created everything.
- The creation is designed for a purpose.

Both beliefs involve the idea of creation and it is important to understand how this is different from 'creationism'. In the second one, the arguments of the relatively recent intelligent design movement need to be distinguished from traditional beliefs in design.

In order to understand the creationism/ID issues, these distinctions are essential. Confusion arises when the same, or similar, terms are used to refer to substantially different things.

Creation and creationism

The theological idea of creation is that of an act of God in *bringing-into-being* and *sustaining-in-being* everything there is.

The *act* of 'bringing-into-being' is independent of specific *processes* or *timescales*. As Augustine put it in the fourth century CE, creation is *with* time, not *in* time – that is, *time* is part of the created order. This idea of time and space coming into being with the universe is mirrored by modern physics. The idea of creation can run alongside scientific theories about the *origins* of our world, but should not to be confused

with them. 'Creationism', however, needs to be distinguished from 'creation'. The PACE (2007b) resolution mentions this in its second paragraph:

2. For some people the Creation, as a matter of religious belief, gives a meaning to life. Nevertheless, the Parliamentary Assembly is worried about the possible ill-effects of the spread of creationist ideas within our education systems.

'Creationism' adds specific *timescales* and *processes* to the belief in creation. Creationists may regard these as following from particular readings of religious texts. There are, however, several varieties of creationism: (a) *old-Earth creationism*; (b) *progressive creationism*; and (c) *young-Earth creationism*. All assume non-natural acts of God as well as natural ones, (a) in the remote past, or (b) from time to time as the world 'unfolds', or (c) in the geologically recent (*c.* 10 000 years) past. Although the PACE working document 11375 (2007a) mentioned these varieties of creationism, they are missing from the adopted text (2007b). The resolution would have been the better for making it clear that, since about 1980, 'creationism' has popularly come to mean 'young-Earth creationism'. The DCSF *Guidance* clarifies this in its glossary of terms:

Creationism: a term commonly used as shorthand for its most common variant, 'young-Earth creationism'. As well as a belief in creation, it includes the additional belief that creation occurred by specific, non-natural divine events in six 'days' some 6000–10,000 years ago, rather than by God's creative actions through the natural processes of stellar, chemical and biological evolution. (DCSF, 2007: 6)

The problem about the term creationism is that it leaves no word for use by religious believers who wish *both* to identify themselves with belief in creation *and* to distance themselves from belief in a geologically young Earth.

A different view of creation is the orthodox one that God endowed the world with the physical properties needed to function in the regular ways we term natural and summarise in scientific laws. This view has the lengthy name of the *functional integrity of creation* and finds expression in St Mark's gospel (4:27f) in the words:

A man scatters seed on the ground ... the seed

sprouts and grows, though he does not know how. All by itself [Gk automatos, of its own accord – Jerusalem Bible] the soil produces corn – first the stalk, then the ear, then the full grain in the ear. (New International Version)

A young Earth?

It is the *extra* belief in a geologically young Earth, imported by creationists, that raises eyebrows. The current consensus among academic scientists of various faiths and of none, *whose expertise lies in the fields concerned*, is of a universe some 13.7×10^9 years old and an Earth of about 4.6×10^9 years, rather than 6–10 000 years old. Hence:

It is no more appropriate to teach a geologically young Earth in science lessons than it would be to teach phlogiston theory as an acceptable alternative to redox reactions. Claims that a young Earth is a valid alternative theory that should be taught in the interests of fairness, that it should be given equal time, or introduced as a matter of controversy, should, on present scientific understanding, be resisted. There is, at present, no controversy in informed scientific circles about whether the Earth is geologically young or old.

It is important, however, in the interests of good science education, that the rejection of the young Earth component of creationism should not be additionally presented as dismissing the traditional belief in creation itself.

Young Earth claims illustrate the danger, referred to by Galileo, of trying to read changing, contemporary science out of ancient religious writings. He complained about attempts to drag astronomy out of Bible passages such as Psalm 19. In his famous 1615 letter to the Grand Duchess of Tuscany, he quotes with approval the Vatican librarian as saying that:

The intention of the Holy Ghost is to teach us how one goes to heaven, not how heaven goes.

The claim that the Earth is 6–10 000 years old is associated with attempts by Archbishop Ussher of Armagh (1581–1656) and others, to date the Earth from incomplete chronologies in Genesis. The resulting date of 4004 BC for the Earth's beginning was printed in the margins of

some copies of the Authorised Version of the Bible, giving the date a spurious air of authority. It needs to be kept in mind that religious language comes in many different forms, some 33 in the Bible alone, including poetry, proverbs, parables, history, paradoxes and personal and circular letters. ‘Elevated prose’, something between prose and poetry, is used in the early chapters of Genesis for what is a tract against rival Near Eastern cosmologies, rather than as a means of dating the Earth. Cooperation between the science, English and religious education departments in schools is to be encouraged in exploring the many ways in which language is used. There are interesting parallels in the use of *similes*, *metaphors* and *models*, in both science and religion, when talking about what is novel, invisible or difficult to imagine.

It should not be thought that, before the geological discoveries of the nineteenth century, the opening chapters of Genesis were always understood to teach six consecutive, ‘24 hour’ days. Early Church Fathers such as Origen and Augustine thought differently. Origen (c. 225 CE) wrote about the use of the word ‘day’ in the Genesis account of the creation of the Sun on ‘day 4’, asking:

What man of intelligence, I ask, will consider as a reasonable statement that the first and the second and the third day, in which there are said to be both morning and evening, existed without sun and moon and stars ...?

St Augustine (354–430 CE) was even more outspoken – and hardly politically correct! – when he wrote:

Usually, even a non-Christian knows something about the earth, the heavens, and the other elements of this world ... Now, it is a disgraceful and dangerous thing for an infidel to hear a Christian, presumably giving the meaning of Holy Scripture, talking nonsense on these topics ... people outside of the household of the faith think our sacred writers held such opinions, and ... If they find a Christian mistaken in a field which they themselves know well and hear him maintaining his foolish opinions about our books, how are they going to believe those books in matters concerning the resurrection of the dead, the hope of eternal life, and the kingdom of heaven ...?

The historian, Professor David Livingstone (1987: 27), pointed out that:

by and large, Christian geologists had both encountered and accommodated the issue of the age of the earth long before the appearance of Darwin’s theory.

So it has been surprising to find belief in a young Earth undergoing something of a revival among some religious groups through the writings of Ellen White (1827–1915), a Seventh-day Adventist prophetess, her young Canadian disciple, George McCready Price (1870–1963), and of Morris and Whitcomb in their 1961 book, *The Genesis flood*.

Purpose, design and the intelligent design movement

Belief in a purposeful world is held by many religions, but some refer to a world that has gone wrong, which means that the creation sends mixed messages. Charles Darwin’s proposal of *natural selection* as a mechanism for the adaptation of living things to their environments challenged William Paley’s argument for God from the apparent design of each creature. But other ways of claiming design were possible. One, held by Malthus and favoured by Darwin, was that the ‘laws of nature’ were designed and so pointed to a lawgiver. Darwin’s own comparison of what he termed *natural selection* with artificial selection by humans was also seen by some early Christian commentators as implying that intelligence works through nature, much as intelligence works through pigeon breeding.

Darwin’s views on religion fluctuated, although he said:

In my most extreme fluctuations I have never been an Atheist in the sense of denying the existence of a God. (Darwin, F., 1958: 59)

He conceded in one letter to Asa Gray, though remaining agnostic:

I can see no reason why a man, or other animal, may not have been expressly designed by an omniscient Creator, who foresaw every future event and consequence. (Brooke, 1985: 56).

Traditional beliefs in creation and in design, shared by Christians, Jews and Muslims, have appealed to the fact that there is something in existence rather than nothing. Other arguments

have included the *kind* of world there is; the existence of moral order; religious experience; and the intelligibility of nature. About this last factor Einstein commented: ‘*The most incomprehensible thing about the universe is that it is comprehensible*’. A modern ‘candidate for an argument for design’, which can be viewed as suggesting the universe is ‘fine-tuned’ for carbon-based life, is the *anthropic cosmological principle*. In more homely terms it is dubbed the *Goldilocks effect* because the universe, like Baby Bear’s porridge, chair and bed, seems ‘just right’. It appears that if the constants of nature, such as the gravitational constant, were minutely different, we would not be here.

These are not ‘proofs’ in any formal sense, but may be regarded as pointers. It has been argued that belief in God is in the nature of a cumulative case, like a detective investigation. Numerous small pieces of evidence deemed valid, none of which are sufficient in themselves to compel belief, may nevertheless be judged to add up to a convincing whole.

Discussions about whether the universe is designed, or not, have their origins deep in the past. The intelligent design movement only started in the early 1990s. It claims that in nature there are biological systems that are *irreducibly complex*, that is ones that will not work if any components are missing, so that they could not have evolved from less complete systems. Such systems are claimed to have no natural explanation, something which is said to indicate *intelligent design* in creation. A much-quoted example of *irreducible complexity* is the *bacterial flagellum*, a minute propeller that moves certain bacteria. William Dembski, a mathematician, has sought a theoretical basis for naturally occurring objects exhibiting what he terms *specified complexity*, that is too complex to have arisen by natural processes alone. God is not openly identified as the *intelligence*, but seems to be implied.

The ID movement’s argument appears to have the following problems:

- It seems to overlook how the intermediate components of evolutionary processes serve different functions at different stages of the evolutionary process. This renders ID’s complex probability arguments inappropriate – and wrong.
- No one knows if a natural explanation may

be found tomorrow. If so, then on ID reasoning, it would appear that ‘intelligence’, involving explicit intention, is no longer required. Claims made by Behe (1996) that the development of immune systems and blood-clotting processes could not be accounted for by evolutionary change are now known to be incorrect.

- If only what has *specified complexity* points to *intelligence*, what about the rest of creation, all of which has traditionally been seen by the Abrahamic religions and others as God’s activity? If the gaps in current scientific knowledge are the *only* places God is thought to be at work, it seems that the ancient idea of the ‘God-of-the-gaps’ has been resurrected! Long ago, some theologians mistakenly viewed their beliefs about God’s activity in the world as threatened by growing scientific explanations of natural phenomena. They adopted the unnecessary – and self-defeating – strategy of pointing to gaps in current scientific explanations, saying ‘*That’s God*’.

It is difficult to see ID as other than a contemporary version of this muddle – plugging in an explanation of an *agent* (God) where there are currently gaps awaiting scientific explanations of *mechanisms*. C. A. Coulson, first Professor of Theoretical Physics at King’s College London, wrote from a Christian standpoint, when he said:

If He is in nature at all, He must be there right from the start, and all the way through it ... When we come to the scientifically unknown, our correct policy is not to rejoice because we have found God: it is to become better scientists.
(Coulson, 1955: 9,7)

The argumentation of the intelligent design movement in this respect appears flawed and, from its own perspective, counterproductive. As with creationism, the waters are further muddied by taking over two common words – in this instance ‘intelligent’ and ‘design’ – linking them, and assigning to ‘intelligent design’ an idiosyncratic meaning. This has left those who believe in traditional arguments for design without a unique and unambiguous term for the belief that an intelligence (God) has designed the world.

Although the PACE resolution (2007b) comments that ‘*The “intelligent design” idea, which is the latest, more refined version of creationism, does not deny a certain degree of evolution*’, it should now be clear that intelligent

design needs to be distinguished from creationism.

To summarise, the traditional arguments for design are independent of, and not helped by, the *specified complexity* claims of the intelligent design movement, since their central argument appears to be fatally flawed on all three counts listed above. But, to repeat an earlier paragraph, changing appropriate words:

It is important, however, in the interests of good science education, that the rejection of the 'ID argument for design' as a bad argument should not be additionally presented as dismissing the traditional belief in design itself.

Science, particularly biological evolution, with its concepts of *chance* and *selection* does not rule out design, especially in view of the development of *genetic algorithms*. In these, intelligent human agents utilise *chance* and *selection* in design, using computers to mimic the molecular processes involved in sexual reproduction to work out optimum conditions for solving a wide range of problems.

It is not sufficient to point out certain bizarre products of evolutionary processes and claim there cannot be design in the universe. If the universe were purposefully planned to give rise to the elements needed for life as we know it, via a big bang, then certain other things follow. Vast quantities of residual radiation from the nuclear fusions in stars will at a later stage give rise to mutations in organic material. This results both in our rich variety of living matter, but also in oddities and cancers.

It is ironical that the establishment of evolutionary ideas, which people like the Revd Professor Charles Kingsley saw as re-emphasising God's *immanence* in the creation, should be seen as a threat to religion. After all, the eighteenth-century *deists* had pictured God as a cosmic clockmaker who, his work done, only occasionally 'interfered' to wind up or 'tweak' the works. So Charles Kingsley commented:

they find that now they have got rid of an interfering God – a master-magician, as I call it – they have to choose between the absolute empire of accident, and a living immanent, ever-working God. (Kingsley, F., 1877: 171)

Evolution by natural selection can be seen as an effective way of ensuring that available ecological niches are occupied. If climate and food supplies change, but not too rapidly, populations are likely to adapt to these changes rather than die out. In *The origin of species*, Darwin (1860, in Darwin, 1906: 658) cited a letter written to him by Charles Kingsley, saying:

A celebrated author and divine has written to me that 'he has gradually learnt to see that it is just as noble a conception of the Deity to believe that He created a few original forms capable of self-development into other and needful forms, as to believe that he required a fresh act of creation to supply the voids caused by the action to His laws.

Many writers have quoted the Oxford theologian and historian, Aubrey Moore, writing thirty years after the publication of the *Origin*, saying:

Science had pushed the deist's God farther and farther away, and at the moment when it seemed as if He would be thrust out all together Darwinism appeared, and, under the disguise of a foe, did the work of a friend. It has conferred upon philosophy and religion an inestimable benefit, by showing us that we must choose between two alternatives. Either God is everywhere present in nature, or He is nowhere.

Among other things, it made sense of one of the products of evolutionary change referred to above, namely the arising of oddities in a world claimed to have been designed.

Conclusion

The problems under review here have been aggravated by some popular attempts to portray science as justifying atheism – something that gives science an undeservedly bad name. Religion is not 'a scientific theory', and it is odd to turn to science, the study of the natural world, in the hope of answering religious questions about whether there is anything *other* than the natural world (i.e. God) to which the natural world owes its existence. The scientific enterprise, with its subject matter of mass/energy, space and time does not concern itself with 'first causes', such as God. They lie outside its remit. This enables those of all faiths, and of none, to cooperate in a common and worthwhile endeavour.

In the US, most attempts to get scientific creationism and intelligent design taught in science classes at public schools have failed in the courts. They have been judged as religious ideas, contra to the First Amendment of the Constitution. If, however, the topics of creationism and ID are raised by students in science lessons in England, science teachers might choose to spend a little classroom time clarifying the meanings of the ambiguous terms referred to above and in teaching the difference between science and non-science. More than that would, in my view, be inappropriate. Issues such as whether the universe is designed or accidental, though they may be raised by science, are religious concepts, matters that, in the words of the most recent version of *Science in the National Curriculum for England*, fall into the category of issues that ‘*science cannot address*’.

The PACE (2007b) resolution, in conclusion:

urges the member states ... 19.4. to firmly oppose the teaching of creationism as a scientific discipline on an equal footing with the theory

of evolution and in general resist presentation of creationist ideas in any discipline other than religion;

This last clause, perhaps, is too restrictive, because creationism would certainly be the kind of topic that could be tackled as an interdisciplinary study involving citizenship, English, history, philosophy, religious education and science.

In earlier writings, I have frequently advocated the desirability of interdepartmental cooperation in schools over matters of science and religion as well as in PGCE and INSET courses. Teachers may be interested to know that there are published sets of classroom resources on DVDs with written guides for secondary and primary use, which include issues discussed in this article. They are written from the standpoint of mainstream science, and are available from the Science and Religion in Schools Project (www.srsp.net), reviewed in *School Science Review*, **88**(324), 134–135.

References

- Behr, M. J. (1996) *Darwin's black box*. New York: Free Press/Simon and Schuster.
- Brooke, J. H. (1985) The relations between Darwin's science and his religion. In *Darwinism and divinity*, ed. Durant, J. p. 56. Oxford, Blackwell.
- Coulson, C. A. (1955) *Science and religion: a changing relationship*. Cambridge: Cambridge University Press.
- Darwin, C. (1906) *The origin of species*. 6th (last) edn. London: John Murray (the citation first appeared in the second edition of 1860).
- Darwin, F. ed. (1958) *The autobiography of Charles and selected letters* (letter to a Mr J. Fordyce). New York: Dover.
- DCSF (Department for Children, Schools and Families) (2007) *Guidance on the place of creationism and intelligent design in science lessons*. <http://www.teachernet.gov.uk/docbank/index.cfm?id=11890> (accessed October 2007).
- Kingsley, F. (1877) *Charles Kingsley, his letters and memories of his life*. Vol. 2. London. (Cited in Meadows, A. J. (1975) Kingsley's attitude to science. *Theology*, **LXXVIII**(655), 20.)
- Livingstone, D. N. (1987) *Darwin's forgotten defenders*. Edinburgh: Scottish Academic Press/Eerdmans.
- Morris, H. M. and Whitcomb, J. C. Jr (1961) *The Genesis flood*. Philadelphia: Presbyterian and Reformed Publishing Co.
- PACE (Parliamentary Assembly of the Council of Europe) (2007a) *The dangers of creationism in education*. Working document, paras 32 & 33. <http://assembly.coe.int/Documents/WorkingDocs/Doc07/EDOC11375.pdf> (accessed October 2007)
- PACE (Parliamentary Assembly of the Council of Europe) (2007b) *The dangers of creationism in education*. Text adopted by the Assembly on 4 October 2007 (35th Sitting). <http://www.assembly.coe.int/Main.asp?link=/Documents/AdoptedText/ta07/ERES1580.htm> (accessed October 2007)

Further reading

- Ayala, F. J. (2006) *Darwin and intelligent design*. Minneapolis: Fortress Press.
- Jones, L. and Reiss, M. J. ed. (2007) *Teaching about scientific origins: taking account of creationism*. New York: Peter Lang.
- Midgley, M. (2007) *Intelligent design theory and other ideological problems*. Impact pamphlet **15** (ed. Michael Smith). Philosophy of Education Society of Great Britain.
- Poole, M. W. (2007) *User's guide to science and belief*. Oxford: Lion Hudson (from which some of the above material is drawn).

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