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The Creation / Evolution Debate 2002 - 2006

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The debate about creationism and evolution, and which (if either) should be taught in schools, continues despite many publications on the subject. Since the h2g2 Evolution/Creationism University Project was published, there have been several notable developments, and it is the intent of this article to act as a companion piece. The scope of this article is therefore limited to major developments relevant only to the scientific evidence and the public debate surrounding this issue between 2002 and December 2006.

Fossil Finds

Charles Darwin argued strongly in *Origin of Species* transitional fossils should exist. He defined these as organisms showing characteristics of several separate modern groups. Testable predictions such as this are the defining characteristic of post-enlightenment science¹. Since Darwin published his theory, many transitional fossils have been discovered, and this is regarded by many scientists as very strong evidence that Darwin was correct.

Tiktaalik roseae, first described in 2006, has features of both a fish and an amphibian. Its morphology² puts it close to the centre of one of the largest remaining gaps in the vertebrate fossil record. To further emphasise the predictive power of evolution, this fossil was located using evolutionary assumptions about the Earth. The team that found it chose to look in rocks formed in coastal conditions around 300 million years ago since that is when and where evolution predicted that this creature (or one like it) must have lived. This string of correct predictions is extremely unlikely if the assumption of evolution is incorrect, and therefore could be seen as solid evidence in favour of evolution.

Researchers in Australia also uncovered a new specimen of *Gogonasmus* using the same predictive methodology. This proved to be a similar but more fish-like fossil.

One of the most famous of all fossils is 'Lucy', a specimen of *Australopithecus afarensis*, although a more complete, juvenile skeleton of this species has since been discovered. Dubbed 'Lucy's Baby' in the press³ this fossil has bearing on human evolution in several ways. Firstly, since it contains body parts that the original holotype⁴ did not, it provides a test of the accuracy of paeleological comparative anatomy. It is clear that the predictions were remarkably accurate, both with regard to the shape and to the size of the missing bones. This allows us confidence that other reconstructed fossils are also largely accurate. Secondly, we are offered an insight into growth and development in *A. afarensis*. Despite Lucy being little larger than a chimpanzee, young *A. afarensis* had a brain growth pattern similar to that of modern humans, with a long childhood in which the brain continued to develop. This adds further support to the idea that Lucy is an intermediate between chimps and modern humans.

Discovery of what appears to be a pygmy species of humans in Indonesia has also excited controversy. Although the consensus as of 2006 seems to be that this is a representative of a now-extinct species that lived alongside anatomically modern humans only a few tens of thousands of years ago, a substantial group of anthropologists maintain that this is not a separate species but rather a deformed *Homo sapiens*.

Stromatoveris is a fossil from the Precambrian⁵. It has been classified as a transitional between Ediacaran fronds and Cambrian ctenophores⁶. This classification, if correct, is significant in many ways. It would be the earliest transitional, and between two of the most primitive groups. It would also finally render incorrect the frequent creationist claim that there are no Precambrian transitionals. Until now, paleontologists have had to point to the extreme incompleteness of the fossil record at this period to explain this.

Assorted European hominid fossils have also been unearthed, from Neanderthals in Gibraltar to *Homo sapiens* in Russia, largely backing up the 'standard' view of human migration into Europe.

Legal Matters

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ENTRY DATA

Written and Researched by:

Giford

Edited by:

Wilma

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There has been long-running debate, primarily in the USA⁷ as to whether evolution should be taught in schools. Following a legal victory (but PR disaster) for creationism in the 'Scopes Monkey Trial' of the 1920s and the banning of creationism from American schools in 1987, the third major US trial came to a conclusion in late 2005. Known as 'Kitzmiller vs Dover School Board', the judge, Justice Jones, delivered a stinging verdict that not only branded 'Intelligent Design Theory' as re-labelled creationism, but went further and questioned the honesty of some of the creationist witnesses. In one notable exchange, Michael Behe (one of the founders of 'Intelligent Design Theory') was forced to concede under oath that ID has no more basis in science than astrology.

The members of the school board who had attempted to have creationism added to the syllabus against the advice of their scientific advisors were later voted out of office during the 2006 mid-term elections. These elections were not kind to creationists; the Kansas school board was also purged of its once-unassailable creationist majority. 'The people of Kansas are tired of being the laughing stock of not just the nation, but the world,' according to pro-evolution board member, Janet Waugh.

Almost exactly a year later in the UK⁸, a newly-formed and well-funded pressure group called Truth in Science has succeeded in having legislation introduced to allow the teaching of creationism in school Religious Education lessons. This has brought strong criticism from a surprising number of quarters, including scientists, religious leaders, the British Humanist Association and religious pressure groups such as Ekklesia.

Biochemistry

The genomes of a number of organisms have now been sequenced, following on from the success of the human genome projects in 2003. This allows direct and complete comparisons, and it has to be said that the support this provides for universal common descent is overwhelming. Thousands of new separate points of comparison between species are now available, and these support standard phylogenies⁹ to a remarkable degree. Most remarkable is the success in extracting DNA from Neanderthal remains, preliminary results from which have been published. These should not be confused with the existing mitochondrial DNA results from Neanderthals, although both show Neanderthals to be separate from modern humans but closer to them than any other living species.

There is a small but growing body of evidence in favour of a genetic 'language'. The consequences for evolution and creationism are unclear at present.

Religious Opinion

Most religious leaders continue to regard creationism as a superstition. The Clergy Letter Project has reached its target 10,000 signatories condemning creationism as superstition. Pope John Paul II, regarded as a guarded supporter of evolution, has finally passed on, but the expected anti-evolutionary stance of his successor has yet to materialise.

Creationist Reaction

Following on from stinging criticism of the standards of creationist research in the Dover trial, creationist pressure group (the Discovery Institute) has set up the BioLogic Institute dedicated to research supporting creationism. Although it is shrouded in secrecy¹⁰, and has yet to publish any research, it has already been accused of being based on the model used by tobacco companies to fund research promoting the health benefits of smoking.

With creationism banned and evolution compulsory in virtually all US schools, many creationists have opted to withdraw their children from the state education system entirely and 'home school' instead. US law allows opting out if the parents have objections to the syllabus¹¹.

Miscellaneous

A legged dolphin was caught in 2006. To evolutionists, this shows that dolphins retain the genes for legs from their (comparatively recent) land-dwelling mammalian ancestors. Some of the most dramatic observed examples of lizards evolving also came in 2006, with observations of phenotypical¹² modifications caused by the threat from introduced predators. Anoles in the Bahamas were observed after the deliberate introduction of curly-tailed lizards. The introduction of this new predator was followed by the anoles first becoming faster runners, then better climbers. This is regarded as being an example of natural selection in action.

Two Harvard scientists have succeeded in partially reversing the Krebs cycle, by which plants gain energy by breaking down biological molecules. Martin and Zhang did this using *sphalerite*, a mineral thought to have existed on pre-biotic Earth, as a catalyst. Although abiogenesis¹³ remains far from complete, this is another major link in the chain. Recent work also suggests that, contrary to previous belief, some amino acids spontaneously de-racemise¹⁴ in water, going a long way to explaining why life on Earth uses exclusively one form.

Surveys and Public Opinion

Survey results taken recently show little shift in the opinions of the American public, with creationists and evolutionists each making up around 40 to 50% of the population. One example is given here and another is given here.

Recent surveys also show that creationism is having no measurable impact among scientists. See for example this survey of US Biology Department Heads.

However, creationism does seem to be on the rise in the UK, according to a recent newspaper survey of UK students and a BBC Survey of the general public.

Conclusions

It is clear that over this period, the weight of scientific evidence has been overwhelmingly in favour of evolution. The legal and political disputes have continued, with notable advances on each side. It is possible that creationism is encountering difficulties in the USA, its spiritual home, but making inroads in the UK. There is no sign that any of this is having any effect on the beliefs of the American public.

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- ¹ According to the works of philosopher Karl Popper.
 - ² Body shape.
 - ³ despite being markedly older than Lucy.
 - ⁴ The single fossil defined as being characteristic of a species.
 - ⁵ The designation given to the earliest geological time-period.
 - ⁶ Stromatoveris.
 - ⁷ Where teaching religion in schools is unconstitutional.
 - ⁸ Where Religious Education lessons are compulsory in schools.
 - ⁹ Push for 'family trees'.
 - ¹⁰ One senior member has already been fired for speaking to the press.
 - ¹¹ The requirements change from state to state.
 - ¹² body-shape.
 - ¹³ The study of the origins of life.
 - ¹⁴ Become only one of two possible asymmetric forms.

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