

A humanist discussion of... 'creationism'

Creationists and "intelligent design theorists" use many spurious arguments to criticise evolution and defend their own views. These come in various shapes and forms. This resource, compiled by the Humanist Philosopher's Group, addresses the main themes that recur in these anti-evolutionary arguments. Below the objections are spelt out, and brief responses given. One question not directly addressed here is answered by Richard Dawkins in his "Lament for Douglas Adams" in *The Guardian* (14/5/04): "To illustrate the vain conceit that the universe must be somehow preordained for us, because we are so well suited to live in it, he mimed a wonderfully funny imitation of a puddle of water, fitting itself snugly into a depression in the ground, the depression uncannily being exactly the same shape as the puddle."

1. The complexity of living things: *Living things have such a level of complexity and precision, even at the smallest level, that the only sensible thing is to suppose they have been intelligently designed. They could not have evolved because they could not function at all even if they were just slightly different and because such complexity could not have arisen by chance.*

There are several things going on in this argument. One is an appeal to the "argument from design", which is basically the idea that if something is extremely complex then "the only sensible thing is to suppose it has been intelligently designed." But this just isn't the only sensible thing to conclude. As the philosopher David Hume pointed out, experience tells us certain things are the result of design – watches, cars and video recorders, for example. But when it comes to living things and the universe itself, experience tells us no such thing. Watches and organisms are both complex, but that similarity alone is not enough to justify the assumption that both are designed. The argument thus seems to depend on another element: personal incredulity. To many, it just does seem incredible that complex organism "just" evolved. But the fact that we find something amazing is no grounds for saying it is not true. Many true things are amazing. What we must do is look at what the evidence suggests. If we do, we will find that evolutionary theory can explain the emergence of highly complex organisms, and it also has no problem explaining how it is that things like eyes – which seem to be useless if not "fully evolved" – can evolve from less sophisticated organs that do confer an evolutionary advantage. Obviously, the explanations involved here are very complex. But the creationist objection seems to be that because we

can't imagine what such explanations would be like, they must be false. This is just a refusal to accept that science might astound us. - **JB**

Researchers provided concrete evidence about how the human eye evolved in October 2004 and the box jellyfish has 24 eyes, 16 of which are just pits of light sensitive pigment, useful for some purposes (reported in *New Scientist*, 14/5/05).

2. Macro and microevolution: *Evolution can explain changes within species, but not the origin of new species. No-one has ever seen a new species evolve or explain how it can happen.*

Evolutionary scientists do in fact explain the emergence of new species, and although there are two competing views about how this happens, neither supports creationism. Richard Dawkins, among others, subscribes to the view of the great American paleontologist George Gaylord Simpson who believed, that "macroevolution is just microevolution writ large, writ slow and writ gradual over a sufficiently large number of thousands of generations." Dawkins says he is "increasingly impressed by the speed with which gradualistic selection can accumulate to forge dramatic change. See, for instance, Jonathan Weiner's account, in *The Beak of the Finch*, of the research by Peter and Rosemary Grant on rapid evolution in 'Darwin's Finches' of the Galapagos Islands."

The alternative, propounded most famously by Stephen Jay Gould, is known as "punctuated equilibrium". As Dawkins explains it, this is based on "an alleged 'decoupling' between microevolution – the slow, gradual change in gene frequencies within a gene pool – and macroevolution, which they see as a relatively abrupt springing into existence of new species." But this is a technical difference of opinion. Gould himself was deeply irritated at attempts by creationists to co-opt his view for their ends:

"Since we proposed punctuated equilibria to explain trends, it is infuriating to be quoted again and again by creationists – whether through design or stupidity I do not know – as admitting that the fossil record includes no transitional forms," he wrote. "Duane Gish writes, 'According to Goldschmidt, and now apparently according to Gould, a reptile laid an egg from which the first bird, feathers and all, was produced.' Any evolutionist who believed such nonsense would rightly be laughed off the intellectual stage; yet the only theory that could ever envision such a scenario for the origin of birds is creationism – with God acting in the egg. . . . I am both angry at and amused by the creationists; but mostly I am deeply sad."

See June 2004 story on scientists observing the evolution of a new species at <http://news.bbc.co.uk/1/hi/sci/tech/3790531.stm>

3. "Evolution is just a theory": *Evolutionary theory cannot be tested, verified or falsified. No-one has or could ever know what happened when life on earth began. Therefore it is just a theory, not fact.*

We can and do know about events in the past. If a tree falls in a forest there may be no-one there to see it. But the woodman who comes upon it later can judge whether it was weakened by disease or parasites, or undermined by soil erosion, because each of these causes leaves its own kind of evidence. If soil erosion is to blame then there must be signs of it where the tree stood. Furthermore, if soil erosion is the culprit then we can ask what eroded the soil. Was it wind or water? On the other hand, the suggestion that God may have pushed the tree over does not require evidence of any sort and generates no further scientific questions. - **BL**

"We find that the secular purposes claimed by the board amount to a pretext for the board's real purpose, which was to promote religion." - Judge John Jones, in his judgment on the Dover, Pennsylvania, school board's decision to teach ID in science lessons, 20/12/05.

4. "The fossil evidence is unreliable": *Radiometric dating of fossils is unreliable and fossil evidence is often fraudulent or interpreted poorly. There is even fossil evidence that dinosaurs lived recently. There are 'living fossils' such as coelacanths which have not evolved, providing evidence against evolution. And the relative position of fossils only shows us their level of buoyancy in the great flood.*

"The evidence [for evolution] rests mainly on four large groups of facts: the geographical distribution of animals and plants; the comparative anatomy of animals and plants; the stages by which individual animals grow from the fertilised egg; and the nature and distribution of fossils." (Ian Glynn, *The Anatomy of Thought* pp. 24) Of these, the fossil evidence is perhaps the weakest group because the geological record is subject to earthquakes, landslides and so forth. But fossils only provide the time-line. They are not central to the argument that there is evolution at all. - **BL**

5. "Evolution is a faith position": *Since evolutionary theory is not proven is it a faith position, not sound science.*

Faith is the attempt by a kind of psychological affirmation of truth to bridge a gap between evidence and belief when such a bridge is not provided by the evidence. In the case of the existence of God the gap is wide indeed, which is why religious traditions praise faith and indeed why it is required. But faith implies nothing about the truth of a belief or the

rationality of believing it. Thankfully, therefore, evolutionary theory does not in fact involve, let alone require, faith for belief in its truth at all.

That evolution is not proved as a mathematical theorem may not be a weakness but a strength, for it means that evolution as a theory is testable, and evidence can count for or against it. It is rational to believe that for which there is the best evidence and has been best tested, and that is the nature of sound science. The best available evidence indicates that evolutionary theory is true. This leaves open the possibility that it could be false (an intellectual liberty rarely allowed by religious believers as they seek to immunise their beliefs from all doubt), but that does not in anyway undermine it as sound science or it being what we ought to believe, and this is so because the evidence supports evolutionary theory best. – **JS**

"Modern science does not hold that what is new is always right. On the contrary, it is based on the principle of 'fallibilism'... according to which science progresses by continually correcting itself, falsifying its hypotheses by trial and error, admitting its own mistakes - and by considering that an experiment that doesn't work out is not a failure but is worth as much as a successful one because it proves that a certain line of research was mistaken and it is necessary either to change direction or start over from scratch... This way of thinking is opposed to all forms of fundamentalism, to all literal interpretations of holy writ - which are also open to continuous reinterpretation - and to all dogmatic certainty in one's own ideas." *Umberto Eco, writing in The Guardian, 4/9/04*

6. The second law of thermodynamics: *According to the second law of thermodynamics, systems must become completely isolated systems over time. That means complex life could not have evolved from simple, inanimate chemicals.*

A key notion for understanding thermodynamics is "entropy" (a measure of the quantity of energy unavailable for work) and the second law is basically the law of increasing entropy. What this means is that, for any closed system, over time the amount of energy within the system remains constant, but the proportion of this energy that is unavailable for conversion into work increases. Another way of saying this is that the system must tend towards increasing disorder. Creationists love to tell us that evolutionary theory conflicts with the idea of increasing entropy (which we all agree is a fundamental principle in physics). In fact, nothing better shows their misunderstanding or misuse of science. Their claim is that evolutionary theory requires a decrease in the amount of disorder of a system (for example, that we, as complex organisms, have emerged

from the more disordered state of the primordial soup). In fact it does not. The key words in the above explanation were “for any closed system”. A closed system is one that does not exchange energy with anything outside of itself. The Earth, of course, is manifestly not a closed system (for example, it receives energy from the Sun). In fact, the only totally closed system, as far as we know, is the universe as a whole. In any case, the second law of thermodynamics allows for *localised* reversals of entropy within a closed system. As long as disorder increases across the system *as a whole*, then it is perfectly possible to have increasing order in pockets of that system. The emergence and evolution of complex life-forms on places like the Earth, for example, is bought at the expense of an overall increase in disorder within the universe. So evolutionary theory is perfectly compatible with the second law. – **SB**

7. “The simplest and best explanation is a creator God.”: *The established principle of Ockham’s razor says that when there are two rival theories, we should prefer the simpler. Creation is a far simpler explanation of the origin of life than evolution.*

Simplicity is not the only thing to be looked for in a scientific theory. The theory also has to fit the evidence. If two theories are both compatible with the evidence, then, it can be said, the simpler of the two is preferable. However, it has to be not only simpler but also genuinely explanatory. This means that it has to provide detailed explanations of particular phenomena in all their complexity. Evolutionary theory can do this – it can identify the detailed mechanisms through which new life forms emerge. It offers more than the mere generality that God did it all, by some mysterious process of creation, in six days. A theory has to cohere with other areas of scientific theory. Evolutionary theory does this – it brings together explanations of the origin of species with geological theories, with our knowledge of selective breeding in agriculture, and, most importantly, with modern genetics and its basis in biochemistry. A theory has to generate a productive research programme. Evolutionary theory provides a framework for on-going work in palaeontology, for identifying new fossil evidence and how it fits into the evolutionary picture. More broadly, the neo-Darwinian synthesis of evolutionary theory and genetics provides the theoretical framework for all serious scientific work in biology. The “simplicity” of creationism, in contrast, is achieved only by ruling out all further questions. Someone who asks “And how did God do it?” can be told only “It’s a mystery.” - **RN**

8. “No effect is greater than its cause”: *It is a scientific law that no*

effect can be greater than its cause. Therefore complex intelligent life must have been created by something more complex and more intelligent, not by chance or brute forces.

There is no such law. There are conservation laws for measurable quantities such as energy. That means that you cannot get more energy out of a system than is put in. This law is meaningful because energy is precisely defined and can be measured. On the other hand, "greatness" is too vague to have a conservation law. How would we measure it? In what units of measurement? Besides, there are many measurable quantities, such as height or density, that do not have conservation laws. The origins of complex intelligent life have to be investigated by exact science, and not by appeal to vague metaphysical maxims masquerading as scientific laws. – **BL**

9. "There have been no new major groups of living things for a long time.": *If evolution is a constant process, why does the fossil record show no major new groups of species for a long time?*

In zoology, "major groups" would be called phyla – a phylum being a category such as molluscs, which includes snails and shellfish; echinoderms, which are starfish, sea urchins and so on; chordates, which are animals with spinal cords, including ourselves; arthropods which include insects and crustaceans. The question is, "Why have no major ones appeared in a long time?" Well, major groups don't and shouldn't, according to the Darwinian Theory, just appear. They evolve gradually. Major phyla are different from each other, though ancestrally they were like brothers. They diverged and became separate species, then separate families, then separate orders. It takes time to do that. Think of this analogy. Suppose you have a great oak tree with huge limbs at the base and smaller and smaller branches toward the outer layers where finally there are just lots and lots of little twigs. Obviously the little tiny twigs appeared most recently. The larger boughs appeared a long time ago and when they did appear, they were little twigs. What would you think if a gardener said, "Isn't it funny that no major boughs have appeared on this tree in recent years, only small twigs?" You'd say he is stupid. – **RD**

10. "Evolution cannot explain the origin of life itself": *No-one has been able to create animate life from inanimate matter in a laboratory.*

Mathematically, it is inconceivable that anything as complex as even a simple protein could evolve by chance.

The mathematical impossibility claimed here just doesn't exist. Maths can be used to make evolution appear enormously improbable, but the argument depends on various sleights of hand. For instance, natural selection means that evolution is not quite what you might think of as mere chance. A random mutation that increases survival value is more likely to be passed on than one that doesn't, so if by pure chance we mean a mechanism by which one outcome is no more likely than another, evolution doesn't work by pure chance. Another mathematical illusion is that something can seem highly improbable, but if there are literally billions of opportunities for that improbable outcome to occur, eventually it will. More fundamentally, even if evolution cannot account for the origin of life, that doesn't mean it is false as a theory of how life evolved. It may be that another (scientific) explanation is required to explain how life got going on earth. But that is no counter argument against evolution. It is like saying that the explanation for why a fire spread is false because it doesn't tell us how the fire started. But how the fire started and why it spread are two different issues. Finally, it should be pointed out that biochemists are much closer than creationists claim to explaining how life could have started. They can already explain how the basic building blocks of life, such as primitive nucleic acids and amino acids, could have formed and organised themselves into self-replicating, self-sustaining units. – **JB**

11. "Mutations cannot produce new features": *Random mutation is the central mechanism of evolution. But mutation can only eliminate traits, it can't introduce new ones.*

This is one of those claims that sounds impressively scientific but which is just false. Responding to this is a bit like responding to someone who says, "Gravity can't account for why helium filled balloons float." It's quite simply an objection born of ignorance. – **JB**

12. The Cambrian Explosion: *Why did the major group of animals suddenly appear in the fossil record at a time known as the Cambrian Explosion?*

We are extremely lucky to have any fossils at all. After an animal dies, many conditions have to be met if it is to become a fossil, and one or other of these conditions usually is not met. It is particularly difficult for animals without hard skeletons to be fossilised. Therefore, we wouldn't ordinarily expect to see the soft ancestors of animals that eventually evolved hard skeletons. We'd expect fossils to appear suddenly, when

hard skeletons arose. There are rare, exceptional circumstances in which the soft parts of animals are preserved. One of the outstanding examples is the fossil bed known as the Burgess Shale, in Canada. The Burgess Shale, together with a similar area in China, is the best fossil bed we have from the Cambrian era. What must have happened is that the ancestors of these animals evolved by gradual degrees before the Cambrian era, but didn't fossilise.

As I said, we are lucky to have any fossils at all. But in any case, it is misleading to think that fossils are the most important evidence for evolution. Even if we had no fossils whatsoever, the evidence for evolution from other sources would be overwhelmingly strong. - **RD**

13. "The lack of transitional fossils": *If evolution is true we would expect to find transitional fossils – for example, of animals that were half-reptile and half-bird. Yet none exist.*

It is astonishing how frequently this is stated in creationist literature. I don't know where it came from, because it simply isn't true. It seems to be sheer wishful thinking. In fact, just about every fossil found can fairly be described as intermediate between something and something else. There are gaps too, for the reasons I have stated [See Q 12, above]. But what there is not is a single example of a fossil in the *wrong* place. The great British biologist J B S Haldane was once challenged, by a zealous proponent of Karl Popper's philosophy of science as *falsifiable*, to name a single discovery which would falsify the theory of evolution. "Fossil rabbits in the Precambrian," Haldane growled. No such misplaced fossil has ever been authentically found. [...] there is a purely semantic point about classification. I can explain it best with an analogy. Children turn gradually and continuously into adults but, for legal purposes, the age of majority is taken to be a particular birthday, often the eighteenth. It would therefore be possible to say, "There are 55 million people in Britain but not a single one of them is intermediate between non-voter and voter. There are no intermediates: an embarrassing gap in the developmental progression." Just as, for legal purposes, a juvenile changes into a voter as midnight strikes on their 18th birthday, so zoologists always insist on classifying a specimen as in one species or another. If a specimen is intermediate in actual form (as many are, in accordance with Darwinian expectations) zoologists' legalistic conventions still force them to jump one way or the other. Therefore the creationist's claim that there are no intermediates has to be true *by definition* at the species level, but it has no implications about the real world – only implications about zoologists' naming conventions. The proper way to look for intermediates is to forget the

naming of fossils and look, instead, at their actual shape and size. When you do that, you find that the fossil record abounds in beautifully gradual transitions, although there are some gaps too – some very large and accepted, by *everybody* as due to animals simply failing to fossilise. – **RD**

14. “Even evolutionary theorists disagree (and not all scientists accept evolutionary theory)”: *The uncertainty of evolutionary theory is proven by the fact that even evolutionary theorists disagree – such as Richard Dawkins and Stephen J Gould.*

The proportion of qualified scientists who do not accept evolution is minuscule. A few are much touted as possessing PhDs. but their PhDs are seldom from respectable universities or in relevant subjects. Electrical and marine engineering are, no doubt, perfectly respectable disciplines, but their practitioners are no more qualified to pronounce on my subject than I am qualified to speak on theirs. It is true that qualified biologists do not speak with one voice about every detail of evolution. Arguments will be heard in any flourishing branch of science. Not all biologists agree about the relative importance of Darwinian natural selection in guiding evolution, as compared with other possible forces such as genetic drift or higher-level quasi-Darwinian forces such as ‘species selection.’ But all reputable biologists, without exception, would accept the following proposition. All animals, plants, fungi and bacteria living today are descended from a single common ancestor who lived more than three billion years ago. We are all cousins. This is not “controversial” and it is not only “some” scientists that believe it, except in the most narrowly pedantic meaning of the words. It is as near being a demonstrated fact as the theory that the alternation between night and day is caused by the rotation of the earth. – **RD**

15. “Science needs to respect the limits of human intelligence”: *Our knowledge is limited by our finite intellects. We must keep our enquiries within its bounds and not venture to speculate about ultimate causes beyond our knowledge.*

There is nothing wrong with speculation, imagination and flights of fancy. Many lives are enhanced by fantasies, impossible dreams and hunches on which horse will win the day's races. What is wrong is to present such speculations as knowledge; and scientific investigation is the best means we have of avoiding that mistake. True, theories are put forward, but they have to answer to challenges of consistency, the evidence and the success of their predictions; that is how they come to be revised or rejected – or to gather support. Evolutionary theory, through such a process, now has overwhelming scientific support. If we want to turn to

speculation about ultimate causes, often clothed as a knowledge that shows little respect for our finite intellects, we need only consider the claims of many theists – that they know that there is a God who created the universe, that he has a purpose, that he is love, all good and all powerful – and that his word is to be found in some holy book. And what is the evidence for that last claim? "Oh, it says so in the holy book." - **PC**

16. "The survival of the fittest is circular reasoning": *Evolutionary theory says the fittest survive, but the fit test are defined as those that survive. Therefore its logic is circular.*

Indeed, if evolutionary theory amounted to nothing more than the claim that if something survives, then it is by definition the fittest, neither opponents nor supporters should be excited. It would still be better than, for example, saying that God commands the good because what is counted as good is whatever God commands – for at least we can easily agree that, at least in one sense, the fit test just are those that survive whereas it is controversial (to say the least) that what is good must be understood in terms of what God commands. Evolutionary theory goes way beyond the platitude. It notes that there are variations in offspring and at least some of the variations are inherited; indeed, we now have an understanding of this in terms of a genetic mechanism. It also notes that more offspring tend to be produced than can survive and that environments undergo change; and it explains why some variations survive rather than others – it does not say that they survive because they are the survivors. There is an account of how different characteristics arise and why some persist and some do not. So, yes, the fittest survive; but the theory is explaining how the fittest come about and why their characteristics enable survival – that is, via natural selection. This is an explanatory account – and not a definition. It is an account in terms of causes, not in terms of anybody or anything being supposed to be mysteriously engaged in designing the species. – **PC**

17. "If Darwinism were true our theories would be unreliable": *If we are descended from lower animals then our capacity to understand would be extremely unreliable. So a belief in evolution should make us trust our theories even less, while only a belief that we were made in God's image would justify belief in our intellectual powers.*

This is a version of the genetic fallacy, which has nothing to do with genes but with arguments that confuse a thing's nature with its historical origins. One doesn't have to be an evolutionary psychologist to admit the possibility that our evolutionary history may have equipped us with

intellectual faculties that are limited in certain ways. It has been argued, for example, that perhaps the solutions to some long-standing philosophical puzzles, such as the relation between the mental and the physical, are “cognitively closed” to us. It's not that we're not clever enough, but that our brains haven't developed in the right sort of way. The problem with this is that, from where we stand, we have no way of knowing if this is true (we are cognitively closed with respect to cognitive closure!), so it would be premature, to say the least, to stop trying to arrive at solutions. But cognitive closure is possible even if we believe we have been divinely designed. After all, we are not gods. Either way, the nature of our origins is a poor basis for scepticism regarding our current intellectual abilities, and no basis at all on which to judge an argument or theory. – **SB**

18. Frauds and errors: *The history of evolutionary science is filled with fraud and error. This shows we have no good reason to trust its findings.*

The history of religion is filled with fraud, error, corruption, torture and persecution, but proponents of creationism do not use that as a reason to distrust religious teachings. In any human endeavour, you will find cheats, liars and fraudsters. But evolutionary science contains no more of these than any other. What you need to look at is the overall picture, not notorious incidents of cheating. With evolution, as with all science, explanations only come to be accepted if they are based on evidence that can rigorously assessed by other scientists. This is precisely why there are known cases of fraud: the scientific method finds the fraudsters out. This is why it is inconceivable that the basic tenets of evolutionary theory could be fundamentally wrong or fraudulent. You would have to postulate a conspiracy or cock-up involving hundreds of thousands of scientists to move from the obvious fact of human fallibility and corruptibility to the conclusion that evolution is probably flawed or faked. It is not that the sheer number of scientists who hold evolution to be true is evidence that it is true. It is that they do so because they have all examined the evidence and agree it points the same way. The large number of creationists who think it is not true have not engaged with the evidence in the same way, which is why their testimony counts for less. – **JB**

19. Free speech: *In a free society everyone should be able to have their say. A good many people believe that evolutionary theory is wrong and deny them a voice in schools is a denial of their right of free speech.*

No one is proposing to curtail creationists' right of free speech, nor is there any reason why school pupils should not be taught about the Genesis creation story in Religious Education lessons, preferably alongside

the creation stories of other religions. The question is whether creationism should be taught as science. The science syllabus, like the syllabus in any intellectual discipline, has to be based on the consensus of the relevant intellectual community - what else could it be based on? And the plain fact is that creationism is overwhelmingly rejected by the scientific community, including all reputable biologists. Science teaching, like all teaching, should be open-minded and un-dogmatic, and should encourage pupils to think about the reasons for accepting scientific theories such as the theory of evolution, and the possible criticisms of them. But if creationists want creationism to be taught as science, they first have to persuade the scientific community. And they are free to try. – **RN**

20. “Why are there still monkeys?”: *If we are evolved from monkeys, why are there still monkeys?*

Humans are not evolved from the monkeys. Rather, humans and the higher primates share a common ancestor. As it happens, that species has died out, but there is no reason in principle why it could not have survived until now as a species separate from homo sapiens. – **JB**

21. “Why should all explanations be naturalistic?”: *Why should all explanations be naturalistic explanations? To claim that this should be so is scientism and merely the expression of a metaphysical prejudice.*

In the final analysis, the dispute between the apologists for creationism, or Genesis literalism, and their opponents is one over naturalism: the view that science should frame its explanations only in terms of natural entities, properties, laws, causes, and so on, and should avoid explanations in terms of the supernatural or divine. All other differences are disagreements over detail. Of course, this normative claim about science is a problem for the believer in so-called “creation science” (who wishes to pass off Genesis literalism as science rather than religion) because he or she precisely wants to include reference to the supernatural and divine in scientific explanations. Firstly, the charge of scientism is spurious. Naturalism, as it is construed above, does not argue that every problem must have a scientifically based solution and allows for the possibility that many (for example, the meaning of life, or why there is something rather than nothing) may not. It does not even argue that all naturalistic explanations should be scientific. What it does claim is that all explanations *in science* should be naturalistic and, therefore, in so far as creationism aspires to be a science, its explanations should appeal only to natural causes, entities, and so on. Is this just a clash of fundamental world-views? This self-denying ordinance (that scientific explanations should not appeal to the supernatural or divine) is not just a metaphysical

preference (though it is that too). Rather, it is a basic methodological assumption about how science operates and about what we expect of a particular scientific theory. We might term this expectation the “fecundity” of a theory. Put simply, we want and expect our scientific theories to give rise to new investigative possibilities, to pose new problems, by which we make new discoveries, perhaps to suggest new problem-solving strategies, and so on. This is how science expands and progresses. The problem with supernatural and divine explanations is that they impose “closure” rather than open up new empirical horizons. Given that the supernatural and the divine are notoriously difficult to investigate empirically, what do we do, as scientists, with such claims as “Each life-form was created at a particular time by a Creator God with features that manifest the Creator God’s design”? What is worse, an appeal to the supernatural or divine in this manner appears to be designed so as to end debate. If they are honest, creationists do not want scientific, let alone naturalistic, explanations of phenomena such as life. What they want is the mystery and finality of a divine explanation. – **SB**

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