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Answering another uninformed atheist: Galileo, Miller–Urey, probability

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Last week, we answered a poorly informed atheist about DNA complexity, and cited Gordy Slack, an evolutionist himself, agreeing that “some proponents of evolution are blind followers”. This week, we provide another example. Varun S. of Switzerland makes a number of false assertions that he could have corrected with a little study of our website. The letter is [first posted in its entirety](#), then [answered point by point](#) by Dr Jonathan Sarfati.

For my part, I’m a biologist first but more so an atheist. I see you are hell bent on trashing Darwinian evolution. Let me remind you that the church ordered Galileo to stand trial for heresy in 1633, because he provided undeniable proof that went against the stand that your holy scriptures take. And yet despite mounting evidence in subsequent years for the heliocentric model, the church chose to accept it’s mistake on the 31st of October 1992, nearly 360 years after he was made to stand trial. But it didn’t really matter did it, whether the church accepted it or not, because most people in the world had.

I think the main reason why the church in particular was breaking its back on trashing the heliocentric model was because it goes beyond the general notion of the bible that defines the earth to be god’s special creation (hence assigning it a special place in the universe). If someone initiates a debate on the creation of biomolecules from a pre-biotic soup, you conveniently quote Fred Hoyle “This is akin to the probability of a tornado moving through a junkyard resulting in the assembly of a complete Boeing 747” but you fail to see the other side of the coin, the Drake equation for example, or even the fact that there are 10^{11} galaxies in the universe, each with 10^{11} stars, so the probability of life arising in more than one of these is not small, in fact it’s a finite value. You conveniently forget Miller’s experiments and its extensions, which demonstrated the synthesis of amino acids and other important molecules such as nucleotides (required for DNA and RNA synthesis) from inorganic molecules in conditions that simulate very well, the early earth.

Your so called Young Earth Creation researchers (if such a term is applicable) state that dinosaurs coexisted with man, despite radiometric evidence. If such were the case, why have paleontologists never discovered fossilized humans of similar age?

YEC has failed to make any impact. 50% of the population in the United States still agrees that humans evolved from lower life forms and this number is only higher outside the US. In fact the Roman Catholic Church itself accepts the possibility of theistic evolution (or Christian Darwinism)

Throughout history, the church has made nothing more than a fool of itself, constantly demeaning valid scientific theories. I challenge all young earth creationists to set up an experiment of your own to prove that the earth is 6000 years old, without pointing to some random passage in the bible. True, Evolution is not a complete theory and there are still gaps and issues that one doesn’t understand, but the evidence for it mounts with each passing day and it’s only a matter of time before Evolution emerges as a valid scientific theory that will be universally accepted and I’d give anything to see the faces of YECs when that day comes.

For my part, I’m a biologist first but more so an atheist.

Nice to see that you have your priorities right—emphasising your [faith](#) above your science!

I see you are hell bent on trashing Darwinian evolution.

Of course; trashy theories deserve to be trashed, and it’s appropriate for the 200th anniversary of Darwin’s birth.

Let me remind you that the church ordered Galileo to stand trial for heresy in 1633,

No need to remind us, thanks, since [we have plenty of articles addressing the widespread misinformation on this](#). Indeed, I [recently wrote one myself, since it’s the 400th anniversary of Galileo’s turning his telescope to the sky](#). But as for “heresy”, science historian John Heilbron provides further evidence in his book *The Sun in the Church*.¹

In this book, favourably reviewed by the secular science journals *New Scientist*² and *Science*,³ he points out:

“Galileo’s heresy, according to the standard distinction used by the Holy Office, was ‘inquisitorial’ rather than ‘theological’. This distinction allowed it to proceed against people for disobeying orders or creating scandals, although neither offence violated an article defined and promulgated by a

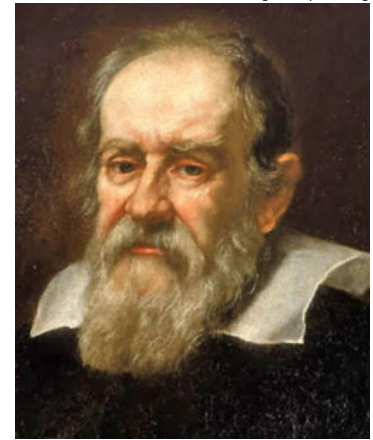


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Galileo Galilei

Far from opposing astronomical research, the church supported astronomers and even allowed the cathedrals themselves to be used as solar observatories—hence the

pope or general council. ... Since, however, the church had never declared that the Biblical passages implying a moving sun had to be interpreted in favour of a Ptolemaic universe as an article of faith, optimistic commentators ... could understand 'formally heretical' to mean 'provisionally not accepted'."⁴

subtitle of science historian
Heilbron's book, *The Sun in the
Church: Cathedrals as Solar
Observatories*.

Heilbron supports this simply by documenting the general reactions by Galileo's contemporaries and later astronomers, who:

"appreciated that the reference to heresy in connection with Galileo or Copernicus had no general or theological significance".⁵

This is shown by the fact that far from opposing astronomical research, the church supported astronomers and even allowed the cathedrals *themselves* to be used as solar observatories—hence the subtitle of Heilbron's book, *Cathedrals as Solar Observatories*. These observatories, called *meridiane*, were 'reverse sundials', or gigantic pinhole cameras where the sun's image was projected from a hole in a window in the cathedral's lantern onto a meridian line. Analyzing the sun's motion further weakened the Ptolemaic model, yet this research was well supported. And Arthur Koestler documented that only 50 years after Galileo, astronomers of the Jesuit Order, 'the intellectual spearhead of the Catholic Church', were teaching geokinetic astronomy in China.⁶

because he provided undeniable proof that went against the stand that your holy scriptures take.

As explained before, there is no conflict with Scripture, but there was plenty of conflict with the establishment *science* of his day (Aristotelianism).

And yet despite mounting evidence in subsequent years for the heliocentric model,

Nice admission, albeit inadvertent—i.e. the evidence *in Galileo's time* was far from conclusive, and his own best "proof" involving the tides was fallacious. It's only fair to judge people according to the *evidence they had available*, not with 20/20 hindsight.

the church chose to accept it's mistake on the 31st of October 1992, nearly 360 years after he was made to stand trial.

Yes, Pope John Paul II apologized, for what was largely a matter of personality politics of his predecessor and of Galileo himself. Dr Thomas Schirmacher documents in his paper [The Galileo affair: history or heroic hagiography?](#):

"Contrary to legend, Galileo and the Copernican system were well regarded by church officials. Galileo was the victim of his own arrogance, the envy of his colleagues, and the politics of Pope Urban VIII. He was not accused of criticising the Bible, but disobeying a papal decree."

In any case, apologies for the past are quite fashionable and not too much should be read into them. In Australia, we had an [official government apology for alleged stolen generations of Aborigines](#), and the [Church of England cravenly apologized to Darwin last year](#). But I think that the British social commentator Dr Theodore Dalrymple, a physician who worked in prisons and slums as well as third world hospitals, and not a Christian, nailed this whole approach in [False Apology Syndrome: I'm sorry for your sins](#):

...

But official apologies for distant events, however important or pregnant with consequences those events may have been, are another matter entirely. They have bad effects on both those who give them and those who receive them.

The effect on the givers is the creation of a state of spiritual pride. Insofar as the person offering the apology is doing what no one has done before him, he is likely to consider himself the moral superior of his predecessors. He alone has had the moral insight and courage to apologize.

On the other hand, he knows full well that he has absolutely no personal moral responsibility for whatever it is that he is apologizing for. In other words, his apology brings him all kudos and no pain.

This inevitably leads to the false supposition that the moral life can be lived without the pain of self-examination. The locus of moral concern becomes what others do or have done, not what one does oneself. And a good deed in the form of an apology in public for some heinous wrong in the distant past gives the person who makes it a kind of moral capital, at least in his own estimation, against which he can offset his expenditure of vice.

The habit of public apology for things for which one bears no personal responsibility changes the whole concept of a virtuous person, from one who exercises the discipline of virtue to one who expresses correct sentiment. The most virtuous person of all is he who expresses it loudest and to most people. This is a debasement of morality, not a refinement of it. The end result is likely to be self-satisfaction and ruthlessness accompanied by unctuous moralizing, rather than a determination to behave well.

The effect on some of the recipients of such apologies is likely to be very bad also, for similar though slightly different

The habit of public apology for things for which one bears no personal responsibility changes the whole concept of a virtuous person, from one who exercises the discipline of virtue to one who expresses correct sentiment. The most virtuous person of all is he who expresses it loudest and to most people. This is a debasement of morality, not a refinement of it.—Dr Theodore Dalrymple

reasons.

...

It isn't very difficult to discern what lies behind it: money, and lots of it. Nor does it require extraordinary powers of prediction or foresight to know who would get the lion's share of any such money that was forthcoming.

But even when money is not involved, there are deleterious effects on the recipients of what one might call class-action apologies. Just as those who give them become convinced of their own virtue, so do those who receive them. It is enough that they should be considered victims for them to conclude that they can do no wrong, or at any rate no wrong worth talking about. For what is a personal peccadillo to set beside a great historical wrong?

Most of the pioneering work on geokineticism was performed by young earth creationists.

An apology of this kind, then, or even the supposition that such an apology ought to be forthcoming, exerts a liberating, that is to say loosening, effect upon personal morals. For what can I do wrong to compare with the wrongs that my ancestors suffered at the hands of your ancestors? How dare you even mention it, you hypocrite!

...

False Apology Syndrome — which is not yet found in the *Diagnostic and Statistical Manual of the American Psychiatric Association* or the *World Health Organization's International Classification of Diseases*, tenth edition — is a therefore rich but poisonous mixture of self-importance, libertinism, condescension, bad faith, loose thinking, and indifference to the effects it has on those who are apologized to.

I am, of course, sorry if you disagree.

But it didn't really matter did it, whether the church accepted it or not, because most people in the world had.

As before, most of the Church at the time had, too! Indeed, most of the pioneering work on geokineticism was performed by young earth creationists: Nicolaus Copernicus (1473–1543), a Canon in the church; Johannes Kepler (1571–1630) who made Galileo's theory match observations when he worked out that the planets move in ellipses, and famously said his scientific research was "thinking God's thoughts after Him"; and Sir Isaac Newton (1643–1727), who worked out the laws of motion and gravity to explain all this, wrote more to defend the Bible's history than he did about science—and Galileo himself! Oh, before you think of it, I've already addressed [Newton was a creationist only because there was no alternative?](#)

I think the main reason why the church in particular was breaking its back on trashing the heliocentric model was because it goes beyond the general notion of the bible that defines the earth to be god's special creation (hence assigning it a special place in the universe).

Wrong again—this is anachronistic misunderstanding of what they thought at the time. As I've pointed out:

For much of church history, the centre was regarded as the lowest place to be. ... So moving the earth away from the centre was, in the context of the middle ages, actually exalting it.

For much of church history, the centre was regarded as the lowest place to be. At the lowest was Hades at Earth's centre, and the abode of man on Earth's surface was the next worse, quite corrupted compared to heavenly perfections. The further away from the centre, the closer to heaven you were thought to be.

The moon, as fairly close to Earth, was regarded as a transitional place. The sun was in a higher plane, planets were pretty good, in their spheres made of the imperishable fifth element (quintessence), but not as exalted as the distant fixed stars, while the firmament was depicted as beyond even the stars, and God's realm was further beyond that.

So moving the earth away from the centre was, in the context of the middle ages,

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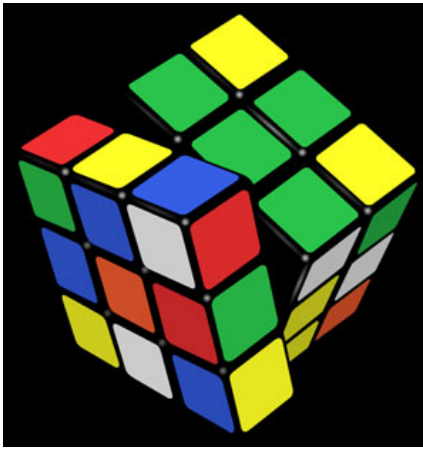
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And this was quite reasonable when it comes to the [origin of the first living cell via chemical evolution](#). We might also quote his comparison with [blind men and Rubik's cubes](#).

but you fail to see the other side of the coin, the Drake equation for example, or even the fact that there are 10^{11} galaxies in the universe, each with 10^{11} stars, so the probability of life arising in more than one of these is not small, in fact it's a finite value.

Au contraire, we consider not only stars and galaxies, but even the number of atoms in the observable universe, and the probabilities is still infinitesimally small. E.g. in my book *By Design*, I point out:

One could calculate the probability of obtaining all these proteins in the right sequence. Certainly there is some leeway in many, but not around the active



A classic Rubik's Cube, scrambled.

sites. However, in others there is hardly any leeway, e.g. the histones that act as spools around which DNA wraps in chromosomes, ubiquitin which is *ubiquitous* in organisms apart from bacteria and essential for marking unwanted proteins for destruction,^{7,8} and calmodulin, the ubiquitous calcium-binding protein which has almost all of its 140–150 amino acids 'conserved' (the same in all organisms).

Even evolutionary writers implicitly concede that some sequences are essential, but they call them 'conserved'—i.e. the sequence was so vital that natural selection conserved it by eliminating variants. As the following conservative calculation shows, even making generous assumptions to the evolutionists (e.g. ignoring the chemical problems), the origin of life from non-life still defies probability.

- 20 amino acids

- 387 proteins for the simplest possible life
- 10 conserved amino acids on average
- \therefore chance is $20^{-3870} = 10^{-3870 \cdot \log_{10} 20} = 10^{-5035}$
- This is one chance in one followed by over 5000 zeroes. So it would be harder than guessing a correct 5000-digit PIN on the first go!

Is time really 'the hero of the plot'? No:

- 10^{80} atoms in the universe
- 10^{12} atomic interactions per second
- 10^{18} seconds in the universe, according to the fallacious big bang theory
- \therefore only 10^{110} interactions possible. This is a huge number, but compared with the tiny chance of obtaining the right sequence, it is absurdly small: only 10^{-4925} .

And since we're on the Drake Equation, the late Michael Crichton had some insightful things to say about this in his serious lecture whimsically titled [Aliens cause global warming](#):

Cast your minds back to 1960. John F. Kennedy is president, commercial jet airplanes are just appearing, the biggest university mainframes have 12K of memory. And in Green Bank, West Virginia at the new National Radio Astronomy Observatory, a young astrophysicist named Frank Drake runs a two week project called Ozma, to search for extraterrestrial signals. A signal is received, to great excitement. It turns out to be false, but the excitement remains. In 1960, Drake organizes the first SETI conference, and came up with the now-famous Drake equation:

$$N = N_{\text{fp}} n_e f_l f_i f_c f_L$$

Where N is the number of stars in the Milky Way galaxy; fp is the fraction with planets; ne is the number of planets per star capable of supporting life; fl is the fraction of planets where life evolves; fi is the fraction where intelligent life evolves; and fc is the fraction that communicates; and fL is the fraction of the planet's life during which the communicating civilizations live.

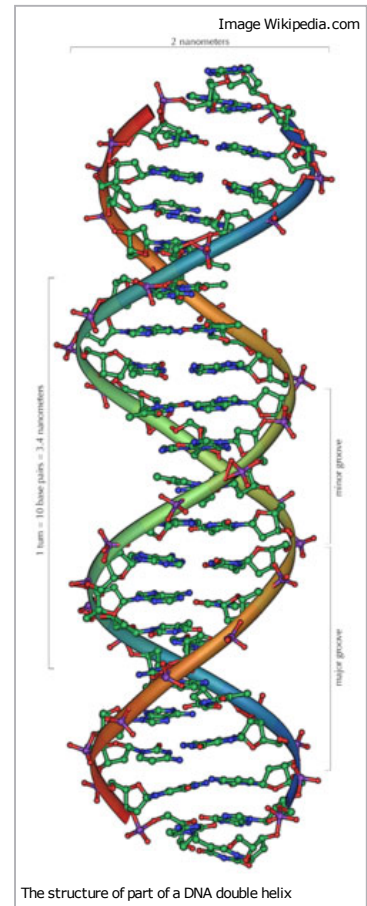
This serious-looking equation gave SETI a serious footing as a legitimate intellectual inquiry. The problem, of course, is that none of the terms can be known, and most cannot even be estimated. The only way to work the equation is to fill in with guesses. And guesses—just so we're clear—are merely expressions of prejudice. Nor can there be "informed guesses." If you need to state how many planets with life choose to communicate, there is simply no way to make an informed guess. It's simply prejudice.

As a result, the Drake equation can have any value from "billions and billions" to zero. An expression that can mean anything means nothing. Speaking precisely, the Drake equation is literally meaningless, and has nothing to do with science. I take the hard view that science involves the creation of testable hypotheses. The Drake equation cannot be tested and therefore SETI is not science. [SETI is unquestionably a religion.](#)

[You conveniently forget Miller's experiments and its extensions,](#)

Of course: that's the point of having articles like [Why the Miller-Urey research argues against abiogenesis](#)—so that such experiments can be conveniently 'forgotten' (i.e., legitimately dismissed).

[which demonstrated the synthesis of amino acids](#)



Indeed, and under such conditions as they are useless for life. They are always produced in trace amounts and grossly contaminated with molecules that would inhibit polymerization, and are racemic rather than the exclusively one-handed forms required for life.

and other important molecules such as nucleotides (required for DNA and RNA synthesis) from inorganic molecules

Nucleotides most certainly are **not** the product of such experiments. Even the three components of nucleotides—phosphate, sugar, base—are produced in traces at best in mutually incompatible conditions. The base cytosine lacks a plausible prebiotic synthesis. See detailed criticisms of the RNA world hypothesis by evolutionary chemist Cairns-Smith and Nucleic acid bases in Murchison meteorite?

in conditions that simulate very well, the early earth.

Apart from such minor details as having the wrong atmosphere, as well as strategically designed traps to isolate the molecules from the destructive energy source that formed them.

Your so called Young Earth Creation researchers (if such a term is applicable) state that dinosaurs coexisted with man, despite radiometric evidence.

You mean like the evidence for rapidly decaying ^{14}C in diamonds, which shouldn't be there if they were millions of years old? And old earth evolution dilettantes state that dinosaurs existed millions of years ago, despite the evidence of blood cells and blood vessels having been found in their bones today, which would hardly have lasted that long.

If such were the case, why have paleontologists never discovered fossilized humans of similar age?

Why haven't they discovered coelacanths and whales fossilized together, although they live in the sea today?

YEC has failed to make any impact. 50% of the population in the United States still agrees that humans evolved from lower life forms and this number is only higher outside the US.

Considering the exclusive evolutionary indoctrination in the media and government educracy, 50% not believing in goo-to-you evolution shows that **we** are making an impact—hence widespread calls of alarm, evolutionary paranoia and dissidents Expelled.

In fact the Roman Catholic Church itself accepts the possibility of theistic evolution (or Christian Darwinism)

Ah yes: You may be a fundamentalist atheist if...

When the Pope says that God may have used evolution, he is an enlightened religious leader whom Christians should listen to. When the Pope preaches on the sanctity of human life from conception, and thus denounces abortion, he's just a senile religious bigot who should keep his opinions to himself.

Many Catholics do *not* accept evolution however, following their Church Doctor Thomas Aquinas, a six-day creationist. Indeed, on 23 February, Catholic scientists, philosophers, and historians gathered in Rome at the National Research Council for a symposium entitled, "The Theory of Evolution: A Critical Analysis" ("La Teoria dell' Evoluzione: Un Bilancio Critico". A report stated, among other things, something most interesting and relevant to a topics discussed in this reponse:

[In Miller-Urey experiments, amino acids] are always produced in trace amounts and grossly contaminated with molecules that would inhibit polymerization, and are racemic rather than the exclusively one-handed forms required for life.

Dr Jean de Pontcharra followed [sedimentologist] Guy Berthault by demonstrating the unreliability of radiometric dating for long ages. Despite very impressive and powerful measurement and characterization tools, and physical and chemical analysis methods, Dr. Pontcharra demonstrated that the dating of rocks using radioactive elements requires very basic assumptions whose validity has not been demonstrated. In the particular case of K/Ar method, the presence of excess Ar and the impossibility of correcting the bias introduced call into question the entire "model ages" results obtained during the last several decades in palaeontology.

On behalf of his co-authors, Dr Josef Holzschuh and Dr Jean de Pontcharra, research chemist Hugh Miller then presented the results of several years of research in the ^{14}C (radiocarbon, RC) dating of dinosaur bones. The discovery of collagen in a *Tyrannosaurus rex* dinosaur femur bone was recently reported in the journal *Science*. When *Triceratops* and hadrosaur femur bones in excellent condition were discovered by the Glendive (MT) Dinosaur & Fossil Museum, Miller asked and received permission to saw them in half and collect samples for ^{14}C testing of any bone collagen that might be extracted. Indeed both bones contained collagen and conventional dates of $30,890 \pm 380$ radiocarbon years (RC) for the *Triceratops* and $23,170 \pm 170$ RC years for the hadrosaur were obtained using the Accelerated Mass Spectrometer (AMS). Total organic carbon and/or dinosaur bone bio-apatite was then extracted and pretreated to remove potential contaminants and concordant radiocarbon dates were obtained, all of which were similar to radiocarbon dates for megafauna. Although the radiocarbon dates are not absolute dates, the fact that dinosaur bones consistently possess the same radiocarbon ages as other megafauna such as mastodons known to have been contemporary with man flatly contradicts the evolutionary time scale according to which dinosaurs became extinct 65 million years ago.⁹

Throughout history, the church has made nothing more than a fool of itself, constantly demeaning valid scientific theories.

The Drake equation can have any value from 'billions and billions' to zero. An expression that can mean anything means nothing. Speaking precisely, the Drake equation is literally meaningless, and has nothing to do with science.—Michael Crichton

Yet according to [Rodney Stark in his book *For The Glory of God: How Monotheism Led to Reformations, Science, Witch-hunts and the End of Slavery*](#):

The reason we didn't know the truth is that ... for more than three centuries [the claim of inevitable and bitter warfare between religion and science] has been the primary polemical device used in the atheist attack on faith. From Thomas Hobbes through Carl Sagan and Richard Dawkins, false claims about religion and science have been used as weapons in the battle to "free" the human mind from the "fetters of faith".

In this chapter, I argue not only that there is no inherent conflict between religion and science, but that Christian theology was essential for the rise of science. In demonstration of this thesis [I show that] not only did religion not cause the "Dark Ages"; nothing else did either—the story that after the "fall" of Rome a long dark night of ignorance and superstition settled over Europe is as fictional as the Columbus story. In fact this was an era of profound and rapid technological progress ... the Scientific Revolution of the sixteenth century was the ... result of [Christian scholarship] starting in the eleventh century ... Why did real science develop in Europe ... and not anywhere else? I find answers to those questions in unique features of Christian theology ... The "Enlightenment" [was] conceived initially as a propaganda ploy by militant atheists and humanists [e.g. Voltaire, Diderot and Gibbon] who attempted to claim credit for the rise of science [through promulgating] the falsehood that science required the defeat of religion.

Furthermore, Stephen Snobelen (Assistant Professor of History of Science and Technology, University of King's College, Halifax, Canada) wrote:

Here is a final paradox. Recent work on early modern science has demonstrated a direct (and positive) relationship between the resurgence of the Hebraic, literal exegesis of the Bible in the Protestant Reformation, and the rise of the empirical method in modern science. I'm not referring to wooden literalism, but the sophisticated literal-historical hermeneutics that Martin Luther and others (including Newton) championed. It was, in part, when this method was transferred to science, when students of nature moved on from studying nature as symbols, allegories and metaphors to observing nature directly in an inductive and empirical way, that modern science was born. In this, Newton also played a pivotal role. As strange as it may sound, science will forever be in the debt of millenarians and biblical literalists.¹⁰

Also, Peter Harrison (Andreas Idreos Professor of Science and Religion at the University of Oxford, and a Fellow of Harris Manchester College) wrote in his book *The Bible, Protestantism and the rise of natural science*:

It is commonly supposed that when in the early modern period individuals began to look at the world in a different way, they could no longer believe what they read in the Bible. In this book I shall suggest that the reverse is the case: that when in the sixteenth century people began to read the Bible in a different way, they found themselves forced to jettison traditional conceptions of the world.

Furthermore, he wrote:

Had it not been for the rise of the literal interpretation of the Bible and the subsequent appropriation of biblical narratives by early modern scientists, modern science may not have arisen at all. In sum, the Bible and its literal interpretation have played a vital role in the development of Western science.¹¹

NB, we would usually call this hermeneutic "plain", "historical-grammatical" or "originalist" rather than "literal", i.e. [what the text meant to the original readers](#) (cf. Snobelen above).

[I challenge all young earth creationists to set up an experiment of your own to prove that the earth is 6000 years old, without pointing to some random passage in the bible.](#)

We don't point to *random* passages, but to [passages chosen for their relevance](#). After all, the Bible is the record of the Creator, who knows when He created. His counsel ([Deuteronomy 19:15](#), [2 Corinthians 13:1](#)) is far better than relying on [dating methods](#) with their [assumptions](#)—even though [many of those still point to an age far younger than evolution requires](#).

[True, Evolution is not a complete theory and there are still gaps and issues that one doesn't understand,](#)

Indeed so. Yet many evolutionists demand that creationists abandon biblical creation because of an apparent anomaly, but if an evolutionist can't answer something, then it's 'the whole purpose of science is to solve problems.' If that's true, then the same allowance should be made for creationists. And obviously, the truth of Christianity doesn't entail infallible knowledge by every Christian!

[but the evidence for it mounts with each passing day](#)

Ipse dixit. Rather, increasing evidence for [design](#) mounts every day, including [intricate features that human designers are learning from](#). Conversely, many of the alleged proofs for evolution have been discounted, e.g. staged photos of [peppered moths](#), Haeckel's forged pictures alleging embryonic [recapitulation](#) and [similarities](#), the alleged [Ostraea to Gryphaea](#) evolution which was merely ecophenotypic change. Indeed, when I was in high school, *Ramapithecus* was taught as a human ancestor, but now it's thought to be a variety of orangutan. My boss [Dr Carl Wieland](#) remembers being strongly influenced when young by *National Geographic* touting *Zinjanthropus boisei* as a human ancestor, which is completely discounted today.

Many evolutionists demand that creationists abandon biblical creation because of an apparent anomaly, but if an evolutionist can't answer something, then it's 'the whole purpose of science is to solve problems.' If that's true, then the same allowance should be made for creationists.

and it's only a matter of time before Evolution emerges as a valid scientific theory that will be universally accepted and I'd give anything to see the faces of YECs when that day comes.

Irrelevant: something can be universally accepted and *still* be wrong. As Peter Medawar (1960 Nobel laureate for his work on tissue grafts and an evolutionist himself) put it:

I cannot give any scientist of any age better advice than this: the intensity of the conviction that a hypothesis is true has no bearing on whether it is true or not. The importance of the strength of our conviction is only to provide a proportionally strong incentive to find out if the hypothesis will stand up to critical examination.¹¹


Related articles

- [Answering uninformed atheists on DNA complexity](#)
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- [Galileo, Geocentrism, and Joshua's Long Day Questions and Answers](#)
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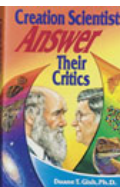
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Comment

Scott Gillis (USA) writes:

I just got done reviewing [this] featured feedback. I read many of the links embedded in the article, so I spent quite a bit of time digesting the information and arguments. I found it to be clear and well written. Thank you for the significant effort. I love creation.com, and I consistently find that it arms me with the answers I need to share the good news that we can trust the Bible as the authoritative communication from our Creator. Thank you CMI!

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1. Heilbron, J.L., *The Sun in the Church: Cathedrals as Solar Observatories*, Harvard University Press, Cambridge, MA, 1999. [Return to text](#).
2. *New Scientist* **164**(2214):98, 27 November 1999. [Return to text](#).
3. van Helden, A., Cathedrals as astronomical instruments, *Science* **286**(5448):2279-80, 17 December 1999. [Return to text](#).
4. Heilbron, Ref. 1, pp. 202-3. [Return to text](#).

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