

Christian apologists should abandon the big bang

Jonathan F. Henry

Some prominent Christian apologists claim that the big bang was God's method of creation. Another common view is that the big bang is an apologetic for biblical creation. By this reasoning, Genesis 1:1 says that there was a beginning, and the big bang was also the beginning of the universe. Thus the big bang is an evidence for creation, not evolution. This is a mistaken conclusion. The ministries of the Christian apologists named in this paper, as well as others that could be named, generally take a high view of Scripture which strengthens Christian faith. The critique of big-bang advocacy in this paper should in no way be taken as a broad criticism of any of these ministries.

Christian apologists advocating the big bang include William Lane Craig, Norman Geisler, Hugh Ross, David Noebel and Lee Strobel. William Lane Craig, Research Professor of Philosophy at Talbot School of Theology, was interviewed by Lee Strobel.¹ Strobel asked, "And the universe came into being in what has been called the Big Bang?"² Craig answered: "Exactly. As [astrophysicist] Stephen Hawking said, 'Almost everyone now believes that the universe, and time itself, had a beginning at the Big Bang.'"³

In an interview with Norman Geisler, at the time Research Professor at Southern Evangelical Seminary in Charlotte, N.C.,⁴ Geisler referred to agnostic Robert Jastrow as claiming that "the Big Bang points to God".⁵ On the basis that the Bible and big-bang theory both posit a beginning for the cosmos, Geisler also accepts that "modern astrophysics ... affirms" that there was a big bang.⁶ Strobel himself concludes, on the strength of big-bang advocacy going back to secular scientists such as Hawking and Jastrow, that "atheism cannot credibly account for the Big Bang."⁷

Apologist David Noebel criticizes secular humanist Paul Kurtz for failing to reckon with the big bang, which, according to Noebel, is a metaphor for creation suggesting "a creative point like that in Genesis 1:1, which is outside the purview of Secular Humanist cosmology."⁸ Noebel further claims that there is still controversy among Christians "about the age of the universe, [but] not whether a Big Bang occurred ..."⁹ Noebel thus implies that the big bang is above questioning in the Christian community. But this is not true.

In *Dismantling the Big Bang: God's Universe Rediscovered*, Christian coauthors Alex Williams and John Hartnett begin with "Four Reasons to Reject the Big-Bang Theory".¹⁰ Their first reason is, "It doesn't work."¹¹ Aside from the scientific difficulties with this theory, the simple fact is that *not all Christians accept it*. Some of these Christians are highly credentialed in physics and astrophysics. Hartnett has a Ph.D. in physics from the

University of Western Australia, where he worked in the Frequency Standard and Metrology research department, as well as working with the European Space Agency's Atomic Clock Ensemble in Space and is a tenured research professor. It is a short step from claiming that virtually all Christians accept the big bang to the equally fallacious assertion that the big bang is incompatible with atheism. Yet Hartnett reflects that at a young age when he was attracted to a career in cosmology, "I would have described myself as an atheist, believing that the big bang had all the answers ..."¹² *There are atheists as well as Christians who believe the big bang.*

Astronomer Hugh Ross, founder and director of the apologetics ministry Reasons to Believe, has written that Christian resistance to big-bang theory is from "a failure to understand the biblical roots of big-bang cosmology."¹³ This claim is part of a chapter entitled "The Big Bang: The Bible Said It First".¹⁴ To Ross, the big bang is in the Bible because it teaches that in the beginning God "stretched out the heavens".¹⁵ *But God's stretching out the heavens signifies the big bang only in the minds of those who want to believe it.* Instead, this phrase connotes not a chaotic event like the big bang, but an *orderly process* consistent with the highly structured origin of the cosmos in Genesis 1.

Further, Genesis 1 teaches that the creation was a *fiat* via the spoken word of God, not a process such as the big bang.¹⁶ Seeing the big bang in Scripture is therefore a reading-in of extra-biblical beliefs—an *eisegesis*—and not an exegesis. Probably at one time or another almost every manmade idea has been "seen" in Scripture, including the justification of slavery before the American Civil War. *The Bible nowhere explicitly teaches a big bang, but does explicitly teach recent fiat creation.* The big bang as a naturalistic process occupying billions of years, and recent *fiat* creation, are not compatible. There are in fact many variants of big-bang theory. In this paper, "big-bang theory" means all variants collectively; the phrase "big-bang model" refers to a specific variant.

Scientific difficulties with big-bang theory

Belief that big-bang theory is a suitable Christian apologetic is flawed because it overlooks serious scientific weaknesses. Big-bang theory has in fact grown more problematic with time. In the late 1940s, it appeared that the big bang could explain the synthesis of virtually all elements and their relative abundances in the universe.

In the 1950s, it became apparent the big bang could account for *at most* the synthesis of only the first few elements, and the rest must have been synthesized in stars. But stellar synthesis of elements (“stellar nucleosynthesis”) has also turned out to be problematic. In his Nobel lecture, William Fowler, a pioneer in big bang and stellar nucleosynthesis theory, acknowledged:

“In spite of the past and current research in experimental and theoretical nuclear astrophysics Hoyle’s grand concept of element synthesis in the stars [is not] fully established, It is not just a matter of filling in the details. *There are puzzles and problems in each part of the cycle that challenge the basic ideas underlying nucleosynthesis in stars* [emphasis added].”¹⁷

Over the years, theorists have found it necessary to add various “unobservables” to the big bang to bring it into line with observations. Dark matter, dark energy, the missing mass, and a hypothetical super-fast expansion called cosmic inflation happening right after the big bang itself are all by nature unobservable—i.e. *they are defined in such a way that they are not observable but can be inferred only indirectly*. Scientists cannot observe dark matter, for example. Thus big-bang theorists have to believe in these concepts *by [blind] faith*. Christian apologists embracing the big bang as if Scripture revealed it appear to be unaware of this subjectivity.

These unobserved entities are needed to control the universe’s expansion rate so the big-bang universe matches the real universe in properties like its size. Without these entities, big-bang theory fails.¹⁸ The emphasis of this paper is not on the big bang’s scientific problems—these have been discussed in the reference just cited—but it is fitting to be reminded that *non-Christian big-bang advocates continue to express severe doubts about the theory*. One has written:

“Theorists ... invented the concepts of inflation and cold dark matter to augment the big bang paradigm and keep it viable, but they, too, have come into increasing conflict

with observations. In the light of all these problems, it is astounding that the big bang hypothesis is the only cosmological model that physicists have taken seriously.”¹⁹

Astronomer John Fix has commented on the idea that primordial cosmic inflation validates the big bang: “[T]his explanation for the period of inflation may sound like a fairy tale *It seems unlikely that people will ever be able to confirm the validity of these theories by means of experiments* [emphasis added].”²⁰ As for dark matter, “its existence must remain an article of faith for the true believer in the standard [big bang] model.”²¹ In other words, big-bang theory will remain a faith-based construct.

None of this means that big bang researchers have ceased looking for observational confirmation of the theory. However, one of the latest examinations of radiation in space done to confirm the big bang has instead pointed away from it. This radiation is a very weak microwave radiation that fills all the background of space, so is called the Cosmic Microwave Background (CMB). Big-bang theory predicts that CMB should have a certain type of fluctuation imposed on a smooth background.

The Wilkinson Microwave Anisotropy Probe (WMAP; figure 1) was sent into space to confirm the big-bang prediction, but it did not.²² Instead, the WMAP data (figure 2) are “far outside the current expectations” of big-bang cosmology, and have added “to the anomalies seen in the CMB”,²³ so that numerous free parameters (currently about a dozen) are required to produce a precision cosmology in which big-bang models agree with observation. *This development is the opposite of Christian apologetics claims that the big bang has been overwhelmingly confirmed*.

But didn’t the big bang correctly predict the hydrogen-helium abundance ratio (the H/He ratio) of the cosmos,

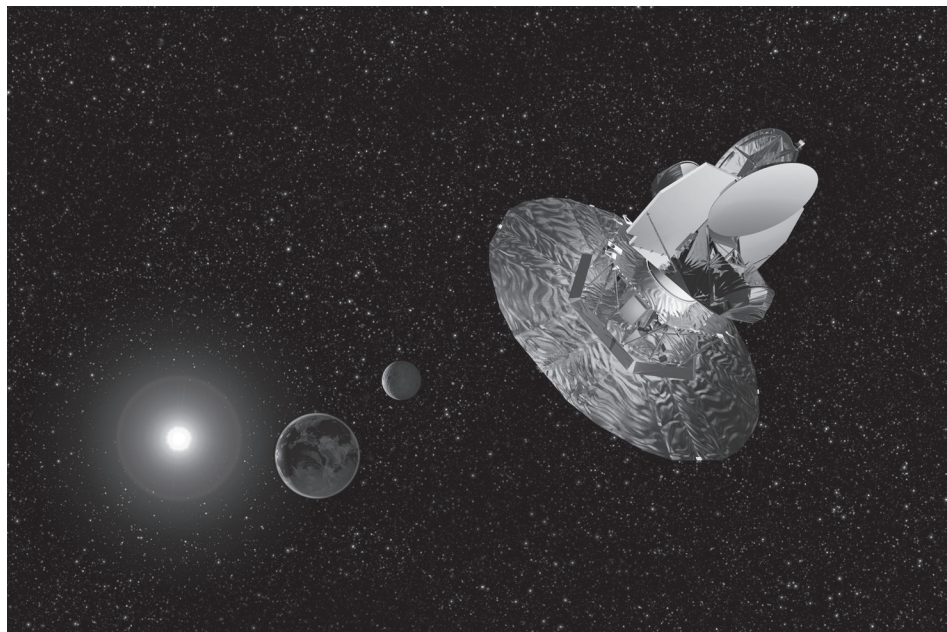


Figure 1. The WMAP satellite (NASA artistic rendering).

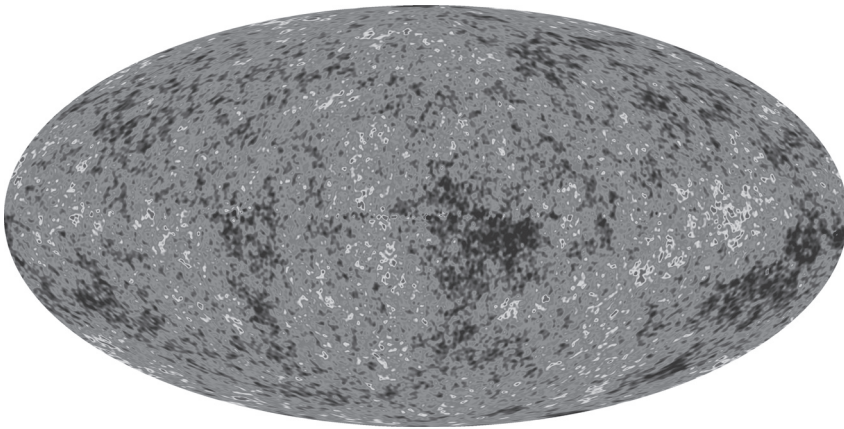


Figure 2. The Cosmic Microwave Background as detected by WMAP (2008).

and didn't it predict the existence of the CMB? Various Christian apologists seem to think so,²⁴ but in fact *the big-bang model has been adjusted backwards to fit the observed H/He ratio*. It did not make a prediction:

“It is commonly supposed that the so-called primordial abundances [of the elements] provide strong evidence for Big bang cosmology. However, *a particular value for the ... ratio needs to be assumed ad hoc to obtain the [observed] abundances [emphasis added]*.”²⁵

Big-bang theory predicted the existence of the CMB but not the correct temperature. On the eve of the first CMB detection in 1965, the predicted temperature was over fifteen times too large.²⁶ *Thus the big bang has not been a successful predictive theory, but one that has needed continuous patching to agree with new observations.*

Aside from scientific difficulties, big-bang theory is actually an evolutionary one which many have come to perceive as a *creationary* one because certain theorists and others have used *creation* to mean *evolution*, a topic discussed in more detail below. But using the big bang as an apologetic means that one is building a doctrinal foundation on the shifting sands of manmade ideas.

Could the big bang have been God's method of creation?

People commonly believe that the universe is expanding, but before the 1920s the reigning cosmic model described a *static universe*, not an expanding one (figure 3). Data emerging in the 1920s were interpreted to mean that the universe was not static after all.²⁷ If the universe were expanding, some said, then running the expansion backwards would mean that the universe began at a single point in time. Today this cosmic singularity is commonly believed to have contained all the mass/energy of the universe when it exploded some 14 billion years ago.

On the other hand, the concept of an expanding universe is not anti-biblical, since there is no requirement that the expansion must have originated with a cosmic

singularity. God could have initiated a cosmic expansion of the just-created universe. Eventually, in the minds of many, the evidence for cosmic expansion was equated with evidence for a big bang. But in the 1920s, the advent of the cosmic expansion concept only opened the door to big-bang theory. Modern big-bang theory was not devised until the 1940s,²⁸ and the big bang did not become the dominant model of cosmic evolution until the mid-1960s with the discovery of the CMB.

In 1920, the expanding universe concept was still in the future. Debate revolved around whether our galaxy, the Milky Way, includes all of the observable

universe (the small universe view), or whether there are galaxies beyond the Milky Way (the large universe). Astronomer D.H. Curtis held out for a small universe. Astronomer Harlow Shapley advocated a large one. The two scientists came head-to-head in one of the most famous debates in the history of science. The Curtis–Shapley debate took place at the Smithsonian Institute on 26 April 1920.²⁹ There was as yet little direct evidence of galaxies outside our own. Even so, the large universe view won the day. Verification of the large-universe view opened the door to the possibility of cosmic expansion, first proposed in the early 1900s. Acceptance of an expanding universe, as noted above, in turn opened the door to the formulation and eventual dominance of the big bang theory.

The Curtis–Shapley debate was commemorated in 1998 at the same location and was called the “Nature of the Universe Debate: Cosmology Solved?” Jim Peebles of Princeton and Michael Turner of the University of Chicago argued for different versions of the big bang. The moderator was Margaret Geller.³⁰ Concluding, Geller asked, “How many think that neither of these models will be represented in such a future debate in 80 years?” About 500 were present. The room was filled with hands in the air.³¹ So much for scientists' confidence in the leading cosmological models. *How can anyone be certain that God used the big bang to create when widespread doubts persist about the long-term survival of the theory itself?*

Does the big bang imply a beginning?

Prominent Christian apologist and big bang advocate Hugh Ross claims that the big bang implies a beginning.³² According to Ross, since Genesis also teaches a beginning, the big bang must therefore be a valid biblical apologetic for creation. Apologist Lee Strobel quotes William Lane Craig as saying,

“Atheists themselves used to be very comfortable in maintaining that the universe is eternal and uncaused. ... The problem is that they can no longer

hold that position because of modern evidence that the universe started with the Big Bang.”³³

By this line of reasoning, the big bang must be a valid Christian apologetic because it has confounded the atheists.

Unfortunately, such claims are little more than wishful thinking, because (1) prominent non-Christians have asserted that the big bang is in fact no evidence for God or a beginning, and (2) the desire for a cyclic universe is still very much alive among non-Christian believers in the big bang. They simply see the current big bang as one part of a longer, possibly eternal series of cycles.

Carl Sagan, a believer in the big bang, famously asserted that, “The Cosmos is all that is or ever was or ever will be.”³⁴ In Sagan’s view therefore, only the *material* is real. Even though he explicitly denied the existence of God, he did not deny that the universe could be open, i.e. a non-cyclic cosmos *with a beginning*, saying “Very likely, the universe has been expanding since the Big bang ...” But he left the door open to the possibility of a cyclic universe: “it is by no means clear that it will continue to expand forever.”³⁵ Gamow was an atheist³⁶ and preferred a cyclic universe with no beginning:

“We can now ask ourselves two important questions: why was our universe in such a highly compressed state, and why did it start expanding? The simplest, and mathematically most consistent, way of answering these questions would be to say that the Big Squeeze which took place in the early history of our universe was the result of a collapse which took place at a still earlier era, and that the present expansion is simply an ‘elastic’ rebound

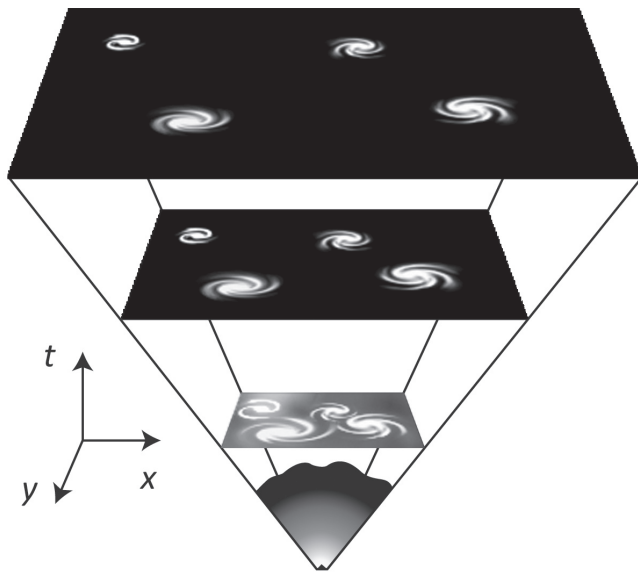


Figure 3. Artistic rendering of the universe expanding after the big bang.

which started as soon as the maximum permissible squeezing density was reached.”³⁷

But then he denied the possibility of cyclic behavior: “There is no chance that the present expansion will ever stop or turn into a collapse.”³⁸

Astronomer James Jeans was not a Christian, yet he proposed that the universe had a beginning. He did this before the big bang was fashionable, *so the big bang is not necessary to conclude that there must have been a beginning*. Jeans’ argument was based on the fact that the entropy (i.e. disorder) of the cosmos is constantly increasing:

“The more orthodox scientific view is that the entropy of the universe must for ever increase to its final maximum value. It has not yet reached this: we should not be thinking about it if it had. It is still increasing rapidly, and *so must have had a beginning*; there must have been what we may describe as a ‘creation’ at a time not infinitely remote [emphasis added].”³⁹

Jeans could be described as a Deist who saw God as having no relationship to the physical universe. For Jeans, the universe was self-existent: “We can only think of [the solar system] as something continually changing and evolving, working out its own future from its past.”⁴⁰ In fact, no one really knows where the big bang came from.

“Nobody has the foggiest idea what happened the Tuesday before the Big Bang. Who can say whether there was a previously collapsing universe or an incipient quantum fluctuation. That whole domain is part of Bubbleland.”⁴¹

In other words, the Bible teaches a beginning, but there is nothing in big bang theory demanding a beginning.

Paul Davies, a big-bang cosmologist who believes in a beginning, denies that an external supreme eternal being could have brought matter into existence.⁴² He asks, “Did God Cause the Big Bang?”, and answers that God causing the big bang

“... makes ‘little sense’ because a supernatural creation cannot be a causative act in time, for the coming-into-being of time is part of what we are trying to explain. Therefore such an explanation cannot be a case of cause and effect.”⁴³

Cambridge University astrophysicist Stephen Hawking is arguably one of the most recognized names in modern evolutionary (i.e big bang) cosmology. Yet he believes in no beginning at all: “[The universe] had no beginning, no moment of Creation.”⁴⁴ Further, he makes no explicit profession of atheism, saying,

“Science seems to have uncovered a set of laws that ... tell us how the universe will develop with time ... *These laws may have originally been decreed by God*, but it appears that he has since left the universe to evolve according to them and does not now intervene in it” [emphasis added].”⁴⁵

But he does not regard God as Creator:

“But if the universe is really completely self-contained, having no boundary or edge, it would have neither beginning nor end; it would simply be. What place, then, for a creator?”⁴⁶

Clearly there is nothing in big-bang theory which inherently points to God or creation.

Confusing creation with evolution

George Gamow, arguably the prime mover behind modern big-bang theory, was one of the first to use the word *creation* when he really meant *evolution*. This was many decades ago, and Gamow’s linguistic conflation met public resistance, which he addressed in the second printing of his (misnamed) book *The Creation of the Universe*. In a note for the second printing, Gamow wrote,

“In view of the objections raised by some reviewers concerning the use of the word ‘creation,’ it should be explained that the author understands this term, not in the sense of ‘making something out of nothing,’ but rather as ‘making something shapely out of shapelessness,’ as, for example, in the phrase ‘the latest creation of Parisian fashion.’”⁴⁷

Thus to Gamow, the big-bang creation was not the *fiat* creation that the Bible teaches. The re-definition of *creation* which Gamow espoused had long been fashionable in the liberal/modernist community. John Gibson is a theological liberal who asserts that a Genesis 1 creation and the Fall lack “any hint elsewhere” in Scripture.⁴⁸ He equates the origins account in Genesis with the Babylonian belief that creation was bringing order out of chaos,⁴⁹ similar to Gamow’s definition. Gibson also writes that maybe God created the chaos, but then maybe “it was there in the beginning, independent of him.”⁵⁰

John H. Walton, an evangelical, notes that, “In the ancient world something came into existence when it was separated out as a distinct entity, given a function, and given a name.”⁵¹ This is also similar to Gamow’s creation concept. Walton notes that ancient Israel’s cosmogony was different from this, for it posited that God is eternally existing but the creation is not.⁵² Gamow had—possibly unknowingly—imported into scientific discussions the pagan concept of creation from antiquity, and tantamount to the modern liberal definition. Henceforth in scientific discussions, *evolution* would increasingly be called *creation*.

But outside of the Christian community, the dominant view is that the big-bang beginning was merely a quantum mechanical fluctuation. Cosmologists John Barrow and Frank Tipler, in *The Anthropic Cosmological Principle*, have a section entitled “Creation Ex Nihilo”. But echoing Gamow, their creation does not involve God. According to them, “These ideas envision the whole universe to be a giant, quantum mechanical virtual fluctuation of the vacuum.”⁵³ Yet how can a vacuum fluctuation give rise to the very existence of the vacuum that fluctuated?

The existence of the vacuum has to be assumed before one can posit such a fluctuation.

Nowadays one can assume almost as a matter of course in cosmology that when *creation* is used, *evolution* is meant, as in the following:

“Each planet seems to provide another set of essential clues for unraveling the mystery of creation. Every planet has proceeded along some peculiar path of evolution all its own—yet each still defines a certain stage in a general process.”⁵⁴

The author of these sentences is in fact expressing his hope that new discoveries will solve the mystery of *evolution*, as the second sentence makes clear. *Christian apologists who advocate the big bang as a creation model have been led astray by this long-standing conflation of evolution with creation*. This conflation was promoted most forcefully by Gamow, a professed atheist.

Giving the big bang credit it doesn’t deserve

Does teaching the big bang in an old universe lead people to Christ? Hugh Ross tells of a visitor to the Sunday school class he teaches who heard class members telling of people “who came to faith in Christ as a result of my ministry.”⁵⁵ “That day”, Ross writes, the visitor “relinquished his belief in the ‘evils’ of young-earth creationism.” This story illustrates Ross’ conflation of old-age advocacy with evangelism. If a long chronology and its attendant evolutionary models such as the big bang are leading people to Christ, then teaching young-earth creation—without the big bang—must be a hindrance to the gospel. But the Bible teaches that even those teaching or behaving erroneously can lead people to Christ (Philippians 1:15–18). Evangelism happens because of gospel words that go out (Romans 10:15), not because of the human error mixed with those words.

Space scientist Robert Jastrow claims to have found God (though not Christianity) in his study of big-bang cosmology. In this context, he famously wrote:

“For the scientist who has lived by his faith in the power of reason, the story ends like a bad dream. He has scaled the mountains of ignorance; he is about to conquer the highest peak; as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries.”⁵⁶

In the mercy of God toward fallen man, His creation is pervaded with His own self-revelation (Romans 1:20). This revelation is sufficiently pronounced that none has an excuse for failing to know Him. It would not be surprising, therefore, if even the flawed theories of men may contain elements of truth. Indeed, there is a design apologetic based on the big bang. Big-bang advocates, both Christian and non-Christian, have noticed that the parameters in the big-bang theory must be finely adjusted. One such parameter is the mass of the universe:

“The universe ... is either barely open or barely closed. In the language of cosmology, we say that the universe is ‘very nearly flat,’ a flat universe being one in which there is just enough mass to bring the expansion to a stop Given all of the infinite possible masses that the universe could have, why does it have a mass so close to this critical value? Why is the universe almost flat?”⁵⁷

The universe is so intricately constructed that any theory will discern design, even a false one. Darwinists, for example, routinely discover intricate designs in living things. Their belief in the rise of life by chance does not prevent their observing designed structures. The cosmos also exhibits structures whose workings are described by natural law. But efforts to apply these laws to the *origins* of these structures via big-bang theory have failed, unless one invokes constructs outside these laws such as dark matter, dark energy and inflation. This failure suggests that the laws of nature which describe how the cosmos functions *cannot be responsible for its origin*.

Conclusions

Putting the big bang on a pedestal because it can be taken to imply a biblical truth—that there was a beginning, or that the universe is designed—is like claiming that all cults and false religions must lead to God and salvation—for each one also contains elements of truth.

Christians can and should be grateful for each person saved through a Christian apologetic outreach, even one advocating the big bang. But Christian apologetics needs to discard its reliance on manmade philosophies, and should be based on a cosmology starting with the recent *fiat* creation of Genesis 1. This is the cosmology that reveals the power of God like no other. It is the cosmology that dominated before the advent of big-bang theory and its precursor, the Darwinian Revolution. It is especially ironic for a Christian to teach the power of God in *future events*, yet to fall back on the claim that *in the past* God was constrained to use a process over billions of years. After all, the Bible teaches that Jesus Christ, the Creator, is “the same yesterday, and today, and forever” (Hebrews 13:8).

The story is told of Francis Deak, a European statesman prior to the catastrophic political Revolution of 1848 and the host of changes it brought about. After that Revolution, “an Austrian official remarked, ‘Deak cannot demand after so many accomplished facts that we should begin affairs all over again’.”

Overhearing the conversation, Deak responded, “Why not? If a man has buttoned one button of his coat wrong, it must be undone again from the top.”

“The button might be cut off.”

“Then the coat could never be buttoned right at all.”⁵⁸

Neither can the cosmos be understood aright by big bang theory. Christian apologists should abandon big bang

theory, and build cosmological theory again from the top by giving the Word of God its rightful authority in the matter of cosmic origins.

References

1. Strobel, L., *The Case for Faith*, Zondervan, Grand Rapids, MI, pp. 80–118, 2000.
2. Strobel, ref. 1, p. 103.
3. Quoting from Hawking, S.W. and Penrose, R., *The Nature of Space and Time*, Princeton University, Princeton, NJ, p. 20, 1996.
4. Strobel, ref. 1, pp. 162–200.
5. Strobel, ref. 1, p. 198.
6. Geisler, N., *Creation and the Courts: Eighty Years of Conflict in the Classroom and the Courtroom*, Crossway, Wheaton, IL, p. 257, 2007.
7. Strobel, ref. 1, p. 351.
8. Noebel, D., *Understanding the Times: The Collision of the World's Competing Worldviews*, Summit Press, Manitou Springs, CO, pp. 102–103, 2006.
9. Noebel, ref. 8, p. 103.
10. Williams, A. and Hartnett, J., *Dismantling the Big Bang: God's Universe Rediscovered*, Master Books, Green Forest, AR, pp. 14–15, 2005.
11. Williams and Hartnett, ref. 10, p. 14.
12. “John Hartnett”, <www.creationwiki.org/John_Hartnett>, accessed 26 February 2009, paragraphs 1–2.
13. Ross, H., *A Matter of Days*, NavPress, Colorado Springs, CO, p. 139, 2004.
14. Ross, ref. 13, pp. 139–148.
15. Ross, ref. 13, pp. 142–143.
16. Henry, J., A critique of progressive creationism in the writings of Hugh Ross, *Creation Research Society Quarterly* **43**:16–24, 2006; pp. 17–22.
17. Fowler, W., The quest for the origin of the elements, *Science* **226**:922–935, 1984; p. 934.
18. Henry, J., The elements of the universe point to creation: introduction to a critique of nucleosynthesis theory, *Journal of Creation* **29**(2):53–60, 2006; pp. 55–58.
19. Oldershaw, R., What's wrong with the new physics? *New Scientist* **127**(1748):56–59, 1980; p. 59.
20. Fix, J., *Astronomy*, WCB/McGraw-Hill, Boston, MA, p. 616, 1999.
21. Sandage, A., Observational tests of world models, *Annual Review of Astronomy and Astrophysics* **26**:561–630, 1988; p. 623.
22. McGaugh, S., Confrontation of modified newtonian dynamics predictions with Wilkinson Microwave Anisotropy Probe first year data, *Astrophysical Journal* **611**:26–39, 2004; p. 26.
23. Rudnick, L., Brown, S. and Williams, L.R., Extragalactic radio sources and the WMAP cold spot, <www.arxiv.org/abs/0704.0908>, 3 August 2007; accessed 27 February 2009.
24. Ross, ref. 13, p. 141; Strobel, ref. 1, p. 141, quoting Walter L. Bradley.
25. Arp, H., Burbidge, G., Hoyle, F., Narlikar, J. and Wickramasinghe, N., The extragalactic universe: an alternative view, *Nature* **346**:807–812, 1990; p. 811.
26. Penzias, A., and Wilson, R., A measurement of excess antenna temperature at 4080 Mc/s, *Astrophysical Journal* **142**:419–421; p. 420, 1965. Dicke, R., Peebles, P., Roll, P. and Wilkinson, D., Cosmic black-body radiation, *Astrophysical Journal* **142**:414–419, 1965; p. 415.

27. As is often the case in cosmology, it was not actually the *data* that suggested expansion but a certain bias for *interpreting* the data. One of the earliest framers of the “expanding universe” concept wrote: “The expansion of the universe is a matter of astronomical facts interpreted by the theory of relativity.” Lemaître, G., Contributions to a British Association discussion on the evolution of the universe, *Nature* **128**, Supplement, p. 704, 1931.
28. Alpher, R., Bethe, H. and Gamow, G., The origin of the chemical elements, *Physical Review* **74**:1198–1199; p. 1198, 1948. Other papers leading to modern big-bang theory are discussed in Henry, ref. 18, pp. 55–56. George Gamow was the driving force behind early modern big-bang theory and was also known for his sense of humor. For the paper referenced above, Gamow added Bethe’s name as a coauthor. This made the authors’ last names start with (and sound like) the first three letters of the Greek alphabet, alpha, beta, gamma. This was Gamow’s alpha-beta-gamma paper. Center for History of Physics, “A Gamow joke”, <www.aip.org/history/cosmology/ideas/gamow-joke.htm>, paragraph 1, accessed 26 February 2009.
29. Trimble, V., The 1920 Shapley-Curtis discussion: background, issues, and aftermath, *Publications of the Astronomical Society of the Pacific* **107**:1133–1144, 1995; pp. 1140–1142. The format of this meeting was actually that of a discussion, not a debate, as there was no time for rebuttal. Even so, the encounter is now known as the Great Debate. Nemiroff, R.J., The 75th anniversary astronomical debate on the distance scale to gamma-ray bursters: an introduction, *Publications of the Astronomical Society of the Pacific* **107**:1131–1132, 1995; p. 1131.
30. Nemiroff, R.J. and Bonnell, J.T., The nature of the universe debate in 1998, *Publications of the Astronomical Society of the Pacific* **111**:285–287, 1999; p. 285.
31. van Flandern, T., Big bang alternatives, *Biblical Astronomer* **11**(Spring):57–58; p. 58, 2001. Van Flandern, a big bang critic, was present at this event. But Nemiroff and Bonnell also note that “Many raised their hands”. Nemiroff and Bonnell, ref. 30, p. 286.
32. Ross, ref. 13, p. 141.
33. Strobel, ref. 1, p. 105.
34. Sagan, C., *Cosmos*, Random House, New York, p. 4, 1980.
35. Sagan, ref. 34, p. 259.
36. Charles Naeser, one of Gamow’s colleagues, stated “... Gamow ... never did hide the fact that he was an atheist ...” Anderson, D., Interview with Dr Charles Naeser, <www.encyclopedia.gwu.edu/geencyclopedia/index.php?title=Gamow%2C_George_and_Edward_Teller>, paragraph 43, accessed 26 February 2009.
37. Gamow, G., *The Creation of the Universe*, Mentor, New York, p. 37, 1952.
38. Gamow, ref. 37, p. 42.
39. Jeans, J., *The Mysterious Universe*, Dutton, New York, pp. 176–177, 1932.
40. Jeans, ref. 39, p. 159.
41. Berman, B., Strange universe: bubbleland, *Astronomy* **28**(6):106, 2000.
42. Davies, P., *The Mind of God*, Penguin, New York, pp. 39–72, 1992.
43. Davies, ref. 42, p. 69. But see also Craig, W.L., God, creation & Mr Davies, *Brit. J. Phil. Sci.* **37**:163–175, 1986 which address the same kind of claim.
44. Hawking, S.W., *A Brief History of Time*, Bantam Books, New York, p. 116, 1988.
45. Hawking, ref. 44, p. 122.
46. Hawking, ref. 44, p. 141.
47. Gamow, ref. 37, p. vi.
48. Gibson, J., *Genesis*, Westminster, Philadelphia, PA, p. 27, 1981.
49. Gibson, ref. 48, pp. 25–26.
50. Gibson, ref. 48, p. 26.
51. Walton, J., *Ancient Near Eastern Thought and the Old Testament*, Baker, Grand Rapids, MI, p. 88, 2006.
52. Walton, ref. 51, p. 91.
53. Barrow, J.D. and Tipler, F.J., *The Anthropic Cosmological Principle*, New York, p. 440, 1986.
54. Short, N.M., *Planetary Geology*, Prentice-Hall, Englewood Cliffs, N.J., p. 334, 1975.
55. Ross, ref. 13, p. 137.
56. Jastrow, R., *God and the Astronomers*, Norton, New York, p. 116, 1978.
57. Trefil, J.S., *The Moment of Creation*, Scribners, New York, p. 47, 1983.
58. Robertson, P., *Revolutions of 1848*, Harper, New York, p. 307, 1960.

Jonathan Henry earned his doctorate from the University of Kentucky in Chemical Engineering. He is now Chairman of the Science Division and Professor of Natural Science at Clearwater Christian College in Florida. In 1987 he began speaking and writing in defence of “recent creation” when his teaching schedule permitted. He has authored *The Astronomy Book* published by Master Books.
