LIBERTY UNIVERSITY SCHOOL OF DIVINITY

IS THE KALAM COSMOLOGICAL ARGUMENT'S SECOND PREMISE DEFENDABLE?

"A Thesis Submitted to

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By

Mark Karapetyan

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THESIS APPROVAL SHEET

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Grade Date

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Dr. Jonathan Waita, Thesis Mentor Date

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Dr. Edward Martin, reader Date

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CHAPTER ONE

INTRODUCTION

The Kalam cosmological argument, in general, and its second premise in particular, can best be appreciated within the larger context of divine General Revelation, and the narrow context of classical theistic arguments. In religious taxonomy, Christianity is recognized as a revealed religion together with Judaism and Islam. Christianity recognizes God to have revealed himself in two modes, with their expected appropriate human responses. These are Special and General Revelations.

General Revelation, otherwise known as the book of nature, refers to what can be known about the author of nature from nature. Mankind responds to General Revelation using philosophy and science.

Special Revelation refers to what God has directly revealed about himself through his incarnate word, Christ, and his written word, the Bible. Since, in the current era of the church, the Bible alone is epistemically available to us, and it is solely by means of which we know Christ, for the purpose of this paper, we will use the Bible and Special Revelation as synonymous. Mankind responds to Special Revelation by means of theology in general,[1] and systematic theology, in particular. Systematic theology organizes the biblical data into 10 themes, which form its 10 divisions—viz., Bibliology, Theism, Angelology, Anthropology, Hamartiology, Soteriology, Christology, Pneumatology, Ecclesiology, and Eschatology.

In their apologetic endeavor, Christian theologians and theistic philosophers have thematically reduced General Revelation into the following classical theistic

[1] There are various classifications of theology—biblical theology, practical theology, philosophical theology, dogmatic theology, and systematic theology.

arguments: the cosmological, ontological, teleological, and anthropological/moral arguments. The cosmological is arguably the most controversial with versions ranging from the Leibnizian (which sees God's existence as providing sufficient reason for the existence of contingent realities) to the Thomistic (which traces the dynamic and causal chains of contingent realities back to God as the universe's Uncaused Cause and Unmovable Mover), and ultimately to the Kalam, which, in our estimation, more successfully meets the requirements of the Principle of Parsimony. The Principle of Parsimony (attributed to William of Occam) states that, in explaining a thing, no more assumptions should be made than are necessary. Hugo Van Den Berg states: "The Principle of Parsimony, also known as 'Occam's razor', is a heuristic dictum that is thoroughly familiar to virtually all practitioners of science: Aristotle, Newton, and many others have enunciated it in some form or other."[2] In other words, Occam's razor postulates that if there are two competing ideas that explain a certain phenomenon, the simpler idea should be picked to explain such an occurrence.[3] Even Einstein recognized this principle and explained that "it can scarcely be denied that the supreme goal of all theory is to make the irreducible basic elements as simple and as few as possible without having to surrender the adequate representation of a single datum of experience."[4] In fact, it is argued that this effective principle is required, not optional, for the purpose of scientific advancements. When a proposition is too complex, scientists often rely on Occam's razor, the principle of parsimony, to do the "shaving." If the simpler proposition

[2] Hugo Van Den Berg, "Occam's Razor: From Ockham's via Moderna to Modern Data Science," *Science Progress* 101, no. 3 (2018): 261.

[3] For example, suppose that a tourist is lodged at a hut near a railroad somewhere in Kenya. One afternoon, at 4:00 p. m., an unusual, loud noise lasting over sixty seconds is heard outside of the tourist's room. It is more reasonable to assume that a train passing by the hotel was the cause of the commotion, rather than a herd of African Elephants migrating away due to the rainy season.

[4] Elliott Sober, *Ockham's Razors: A User's Manual* (Cambridge: Cambridge University Press, 2015), 1.

is compatible with empirical observation, the proposition with fewer entities is better than the proposition with more. Therefore, according to the Principle of Parsimony, the Kalam cosmological argument is the simpler and better model for the explanation of the universe's existence.

The syllogism of the Kalam cosmological argument may be schematized this way:

P1. Everything with a beginning must have a cause.

P2. The universe has a beginning.

C. Therefore, the universe has a cause.

The first premise of this syllogism is an argument from causality. The universe is the effect of a cause that caused the universe to come into existence out of nothing. The second premise is the most contested and is often rejected by skeptics who doubt the validity of this argument; they insist that (1) the universe does not need a cause and that (2) it is eternal. While the other two cosmological argument versions have their strengths, this researcher's conviction is that the Kalam cosmological argument is clearest and simple enough to be unscathed by Occam's Razor.

The Statement of Need for This Research

Despite the great strengths of the Kalam cosmological argument version, it has not been spared the darts of skepticism. As we said earlier, skeptics have targeted this cosmological argument's second premise without which it cannot stand. The denial of the second premise entails the ultimate denial of the conclusion—the universe had a cause. This requires a defense that this research project is committed to providing.

The Thesis of This Research

The thesis of this research is that contrary to the skeptics' rejection of the fact that the universe had a beginning, it can be philosophically and scientifically demonstrated that the origin of the

universe can be inferred in *inter alia*, the Big Bang and the observable expansion of the universe and supported by the infinite regress hypothesis, all of which establish God's sole self-existent causal candidature. In other words, when all these factors are put into consideration, the sole candidature of the biblical God as the only self-existent cause of the universe is established.

The Procedure of the Research

Apart from the introduction and the conclusion, this project has three major chapters. Coming after the introduction, the second chapter will state the rejection of the 2nd premise of the Kalam cosmological argument and the alternative explanations. These alternative theories are that the universe is eternal, the universe is self-existent, and the universe is necessary. The chapter will end with a chapter summary. The third chapter will present a defense of the Kalam cosmological argument's 2nd premise, providing such evidence as the observable expansion of the universe, the scientific data pointing to the Big Bang, and applying the infinite regress argument to subject the skeptics' denial to *reductio ad absurdum.* The fourth chapter will discuss the relationship between the Big Bang and Darwinian macroevolution. Specifically, the chapter will present arguments for the Big Bang's entailment of the Darwinian macroevolution and therefore the denial of Genesis chapters 1 & 2 creation accounts, before refuting them in favor of the Big Bang's non-entailment of macroevolution. The conclusion will reiterate the fact that the attempted defeat of the Kalam cosmological argument's 2nd premise is unsuccessful, and that the universe had a beginning and a cause, which we refer to as God.

Statement of Position

It is the position of this thesis that the universe had a supernatural beginning at some point in the past, and that its cause is the one, true God of the Bible. For various scientific and philosophical reasons, it is unreasonable to assume that the universe is uncaused. Ultimately, the possibilities

that could explain the existence of the universe are as follows: (1) the universe is causeless and eternal; (2) the universe created itself; (3) the universe had a cause outside of itself. Neither possibility (1) nor possibility (2) withstands scientific or philosophical scrutiny.

Using scientific evidence and philosophical arguments, this thesis will demonstrate that the first possibility is unlikely to be true and that the second possibility is also unreasonable because it is contradictory. For something to have created itself, it would need to have been prior to itself, which is a logical impossibility. If the universe is not eternal, and if it did not create itself, ultimately, the most plausible possibility is the third one—the universe had a cause. In the end, either nothing created the universe, or something created the universe. Therefore, this thesis agrees with the third possibility, which predicates the veracity of the second premise of the Kalam cosmological argument on the divine causal agency.

Limitations/Delimitations

This project is limited in that the research conducted focuses on the aspects of the cosmological argument alone. No other arguments are taken into consideration. Moreover, not all the objections presented by skeptics are dealt with in detail. Only a summary of a few alternate theories and hypothesis germane to the central theme of this paper are dealt with. The purpose of this thesis paper is not to critique the objections to the Kalam cosmological argument, but to defend the second premise of the argument and support it with the recent available evidence.

Despite these limitations, this thesis focuses mainly on the available literature that is published and agreed upon by most theistic and atheistic scientists and philosophers in the field. Moreover, “it could be the case that in the future, a theory of quantum gravity may be justified

and may eliminate the existence of the initial singularity"[5] and even refute the cosmological argument.

The intention of this thesis paper is not to ignore opposing views or alternate hypotheses, but to simply present the second premise of the cosmological argument as a valid proposition that shows the universe had a beginning. Although it is true that no one can predict with certainty the boundaries of this complex universe, it is reasonable to assume that with the aid of science and philosophy, one can successfully come to sound conclusions, among which is that the universe had a beginning. It is worth reiterating the fact that the focus of this paper is the second premise of the Kalam cosmological argument. The paper will not deal with mathematical models or equations in physics or astronomy.

Data Collection

Most of the material for this thesis paper will come from books, journal articles, published works, and scholarly peer-reviewed webpages. Most of the information has already been gathered, detailed, summarized, and listed for future use. The school's JFL library has been a great source of valuable information for this thesis. Countless books, articles, and various publications are available on demand. Therefore, the JFL library will be regularly utilized whenever more information is needed. Moreover, there are several debates posted on the Internet by world-famous experts on this matter. Information, critiques, and analysis will be taken from these debates to supplement this thesis paper with more detailed information.

[5] John J. Park, "The Kalām Cosmological Argument, the Big Bang, and Atheism," *Acta Analytica* 31, no. 3 (2016): 323.

CHAPTER TWO

SKEPTICS' REJECTIONS: ALTERNATIVE MODELS

With the Big Bang's dominance in scientific cosmogonical theories, and the growing number of Christian theologians and apologists who are willing to grant the plausibility of its correspondence to the declared divine fiat creation *ex nihilo* (cf. Gen. 1 & 2), one would expect skeptics to give up their attempted defeat of the second premise of the Kalam cosmological argument—that the universe had a beginning. However, not to be deterred, skeptical scientists have proposed several theories that attempt to provide alternative explanations for the origin of the universe. These theories include the eternality of the universe, the plurality of the universe, the necessity of the universe, and the self-existence of the universe. This chapter will explore these theories and the arguments in favor of them.

The Eternality of the Universe

The eternality of the universe is an archaic concept that dates back to the ancient Greeks. Democritus (341-270 B. C.),[1] the pre-Socratic "laughing philosopher"[2] (known for his focus on the importance of cheerfulness), once noted that there are an immeasurable, infinite number of worlds that vary in size. He wrote that "the universe as a whole is infinite…since the universe has no edge, it has no limit, and since it lacks a limit, it is infinite and unbounded."[3] Lucretius

[1] Joseph Silk, *The Infinite Cosmos Questions from the Frontiers of Cosmology* (Oxford: Oxford University Press, 2006), 182.

[2] Sylvia Berryman, "Democritus," in *Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, winter 2016 ed., https://plato.stanford.edu/archives/win2016/entries/democritus.

[3] Ibid.

(95-55 B. C.) echoed Democritus and wrote that "in all dimensions alike, on this side or that, upward or downward through the universe there is no end."[4] This concept is nothing new.

Contrary to common views, cosmology did not emerge as a scientific field in the twentieth century. In fact, the roots of "observational and conceptual modern cosmology can be traced back to the nineteenth century."[5] A number of physicists argue that Einstein's general relativity of 1917 was the starting point for modern cosmology. Others believe that the discovery of the cosmic microwave background radiation in 1965 paved the way for the birth of cosmology. In general, however, attempts by various thinkers to understand the universe scientifically and philosophically go all the way back to the ancient Greeks. Helge Kragh and Malcom Longair explain that "one can reasonably speak of scientific (or at least proto-scientific) cosmology in the cases of Aristotle, Hipparchus, Ptolemy, and other thinkers of Greek antiquity."[6] Scientific contributions in the field of astronomy by the likes of Copernicus, Kepler, and Newton years later further advanced the understanding of cosmology, since their works dealt with planetary formations and structures—part of the universe in general.

Kragh and Longair also note that in the eighteenth century, Immanuel Kant published an anonymous book called *Allgemeine Naturgeschichte und Theorie des Himmels* (General Natural History and Theory of the Heavens)[7] in which he rejected the possibility of miracles in the universe and proposed a universe with an evolutionary viewpoint. In this model, Kant argued

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[4] Ibid.

[5] Helge Kragh and Malcolm S. Longair, eds., *The Oxford Handbook of the History of Modern Cosmology* (Oxford: Oxford University Press, 2019), 1.

[6] Ibid., 2.

[7] Ibid.

that the universe is the result of chaotic condensations caused by gravitational fields scattered throughout the infinite universe.

Although the standard model of the Big Bang theory was the prevailing view of the origin of the universe in the 1970s, several alternate models were proposed by skeptical scientists in the last decade. One such theory was the "eternal cosmological model"[8] wherein the existence of the universe was explained by constructing a model that avoided the necessity of a beginning point for the universe. An ardent proponent of this model is the American theoretical physicist Sean Carroll, who argues that the finitude or the eternality of the universe can be better demonstrated by building models that explain them. Erasmus quotes Carroll in the following way:

> [I]f you want to know whether something is possible in cosmology or physics, you ask, "Can I build a model?" Can I build a model where the universe had a beginning, but did not have a cause? The answer is yes. It's been done…you might also ask, "Could the universe be eternal" without having a beginning at all? Again, the answer is: yes, just build a model… So, whether or not the universe can be eternal does not come down to a conversation about abstract principles. It comes down to a conversation about building models and seeing which one provides the best account for what we see the universe to be doing.[9]

In other words, according to J.B. Stump and Alan Padgett, Carroll argues that it is possible to postulate an eternal universe as long as a model is built. He further introduces two ways of achieving this: by positing "beginning" cosmologies, in which there is a first moment of time, and "eternal" cosmologies, where time stretches to the past without limit.[10] Beginning

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[8] Jacobs Erasmus, *The Kalām Cosmological Argument: A Reassessment*, Sophia Studies in Cross-cultural Philosophy of Traditions and Cultures, vol. 25 (Cham, CH: Springer International Publishing, 2018), 129.

[9] Sean Carroll, quoted in Jacobs Erasmus, *The Kalām Cosmological Argument: A Reassessment*, Sophia Studies in Cross-cultural Philosophy of Traditions and Cultures, vol. 25 (Cham, CH: Springer International Publishing, 2018), 129.

[10] J. B. Stump and Alan G. Padgett, *The Blackwell Companion to Science and Christianity* (Malden, MA: Wiley-Blackwell, 2012), 4.

cosmology replaces Big Bang cosmology with what J. B. Hartle calls, "quantum cosmology."[11] The simple form of this model parallels space time with a quantum structure. Stump and Padgett cite this explanation from Carroll:

> Even if we don't have a complete theory of quantum gravity, the hope is that the basic features of quantum mechanics and general relativity are sufficiently robust that the details aren't important for this particular question. In particular, *time* may be just an approximate notion, useful in some regimes but not others. Near the Big Bang is an obvious candidate for an era in which time loses its conventional meaning. The important ingredient is then a "boundary condition" that describes the state of the universe at the moment when time is first an intelligible concept. The most famous example is the "no-boundary proposal" of Hartle and Hawking, which constructs the state of the universe by integrating over all possible Euclidean geometries with no other boundaries. By "Euclidean" we mean geometries in which all four dimensions are spatial, in contrast to the "Lorentzian" geometry of spacetime with its distinction between time-like and spacelike directions. One occasionally speaks of "imaginary time," a phrase that has probably not increased the total amount of understanding in the universe.[12]

Carroll insists that it is unreasonable to assume the universe had a beginning or that "it was *created* from nothing"[13] because terms such as "natural, universe, created, from, and nothing"[14] are vague and not well-defined. Instead, he proposes this provoking present-to past model cited by Erasmus:

> To make sense of this, it is helpful to think of the present state of the universe and work backwards, rather than succumbing to the temptation to place our imaginations "before" the universe came into being. The beginning cosmologies posit that our mental journey backwards in time will ultimately reach a point past which the concept of "time" is no longer applicable. Alternatively, imagine a universe that collapsed into a Big Crunch, so that there was a future end point to time. We aren't tempted to say that such a universe "transformed into nothing"; it simply has a final moment of its existence. What actually

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[11] J. B. Hartle, quoted in J. B. Stump and Alan G. Padgett, *The Blackwell Companion to Science and Christianity* (Malden, MA: Wiley-Blackwell, 2012), 4.

[12] Sean Carroll, quoted in J. B. Stump and Alan G. Padgett, *The Blackwell Companion to Science and Christianity* (Malden, MA: Wiley-Blackwell, 2012), 4.

[13] Ibid.

[14] Erasmus, 129.

> happens at such a boundary point depends, of course, on the correct quantum theory of gravity.[15]

Carroll's belief in a beginningless, eternal universe is also accepted by Hawking, who rejects the idea of a divine creator. Hawking notes: "So long as the universe had a beginning, we could suppose it had a creator. But if the universe is really self-contained, having no boundary or edge, it would have neither beginning nor end, it would simply be. What place, then, for a creator?"[16] In addition to his past-to-present hypothesis, Carroll supports his belief in an infinite universe with another idea—that time itself did not have a beginning. Even with Einstein's general relativity and its predictions of a beginning of the spacetime continuum, Carroll thinks that a quantum gravity model could establish an eternal, self-existing universe.

There are also other models physicists have presented that posit an eternal universe. One of the most popular models is the multiverse hypothesis, which posits that the universe "or spacetime is not the only universe and that many other universes (or spacetimes) exist."[17] There are also "bouncing cosmologies in which a single Big Crunch evolves directly into our observed Big Bang, cyclic cosmologies in which there are an infinite number of epochs separated by Big Bangs, and baby-universe scenarios in which our Big Bang arises spontaneously out of quantum fluctuations in an otherwise quiet spacetime."[18] From among these models listed, only the multiverse theory will be discussed in this paper, due to its immense popularity.

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[15] Ibid., 5.

[16] Stephen Hawking, *A Brief History of Time* (New York: Bantam, 1988), 156.

[17] Erasmus, 20.

[18] Stump and Padgett, 5.

The Plurality of the Universe

The multiverse hypothesis is another rejection of the Kalam cosmological argument's second premise, this time on the basis of the alleged universal plurality. Since the Kalam cosmological argument's second premise is predicated on universal singularity, by suggesting universal plurality, the proponents of this hypothesis believe that they have finally defeated the Kalam cosmological argument by way of discrediting its foundational second premise. Contrary to common belief, the multiverse hypothesis is not a new concept. Additionally, there are also many models of this theory, and David Seargent claims that they are all scientifically accurate. Based on the multiverse hypothesis, Seargent cites Tegmark, who divides the multiverse into four different categories.

The level I multiverse, an extension of our universe, is the most basic model out of the four models; this model depends "upon the least number of assumptions."[19] Any universe that is infinite in space with a finite speed of light within such a universe fits the level I model. Tegmark further explains that because of the expansion of the universe, more space is available in the universe today than in the past. If more space is created as the universe expands, the view of the universe cannot be restricted to 14 billion light years only, as proposed by Friedman's model, but to 46 billion light years.[20] In other words, the furthest observable regions of the universe are not 14 billion years (as previously believed), but 46 billion light years distant.

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[19] David Seargent, *Weird Astronomical Theories of the Solar System and beyond* (Cham: Springer, 2016), 226.

[20] The Friedman model, developed in 1922 by the Russian mathematician, Aleksandr Friedman, is a mathematical model that describes the expansion and the contraction of the universe. This model hinges on two fundamental principles: (1) that the universe is homogeneous (the universe is the same everywhere) and (2) that it is isotropic (it looks the same in all directions). Friedman argued that Einstein's general relativity necessitated a theory of a universe in motion instead of a universe that is motionless (static universe). Therefore, Friedman proposed a Big Bang followed by an incredible expansion, then later followed by an eventual contraction.

According to Seargent, the accessible region of the vast universe is what Tegmark calls "the O-sphere or the observable sphere"[21] and argues that O-spheres could overlap the actual universe. An infinite number of O-spheres can exist if the actual universe is infinite. Accordingly, each O-sphere will be a separate universe with physical laws identical to the laws of physics in the observable universe because they all popped into existence from the same point of origin. Lastly, O-spheres will occur whether an actual universe is infinite or not. O-spheres are identical to the actual universe, and they will occur if their boundaries are extremely vast. Seargent concludes: "As we have just seen, if the universe is equal to or greater than 10 to the power of 10^{118} m in extent, exact copies of the entire O-sphere will appear. For there to be an O-sphere containing an exact copy of yourself, [sic] Tegmark calculates an extent of 10 to the power of 10^{29} m would be required."[22] If O-sphere, level I multiverses are intricate, level II multiverses are even more complex and unpredictable.

According to this theory, the level II multiverse contains many level I multiverses, is infinitely large, unique, and possesses different sets of dimensions and physical constants. Additionally, John Barrow claims that "the quantum fluctuations driving chaotic inflation could cause different symmetry breaking in different bubbles, resulting in different members of the level II multiverse having different dimensionality."[23] Moreover, this theory states that a level II multiverse is a self-creating universe that is more dynamic in physical principles than a level I multiverse. While in the process of inflation, he continues to explain that some parts of space no longer stretch, thus, forming an infinite number of bubbles (like gas bubbles in a loaf of bread)

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[21] Seargent, 225.

[22] Ibid., 227.

[23] John D. Barrow, Paul C. W. Davies, and Charles L. Harper Jr., eds., *Science and Ultimate Reality: Quantum Theory, Cosmology, and Complexity,* (Cambridge: Cambridge University Press, 2004), 9.

that are extremely distant and diverse in physical law from one another. Because of the extreme physical properties of these bubbles, some bubbles "would either collapse into black holes or, at the other extreme, inflate into effectively empty spaces, but others would presumably evolve into universes having some characteristics similar to our own albeit differing to greater or lesser degrees in the finer physical details."[24]

The level III multiverse is hypothesized based on Hugh Everett's quantum mechanics, wherein the assumption is that possible outcomes of events can possibly exist in separate and distinct realities. Seargent equates Everett's model of the universe to a "garden having branching paths, with the universe splitting into a separate branch (in effect, an alternative universe) at every point."[25] Based on the principles of quantum physics, elementary particles in the quantum realm can exist in multiple places simultaneously. Humans are made up of these elementary particles. Therefore, humans (or multiple copies of them) can exist in multiple places at once. Moreover, in this hypothetical model it is possible for similar events to have different outcomes from those in other universes. For example, in this level III multiverse, it is possible that Jesus Christ is not crucified, that He survives the crucifixion, or even escapes the cross; it is possible that Queen Anne Boleyn is not beheaded on accusations of adultery; it is possible that World War II did not break out in the early twentieth century.

The level IV multiverse, or the "anything goes model,"[26] is a realm where all universes can be actual, but with completely different laws of physics. It is in this multiverse that "all possible mathematical structures are instantiated in some universe in the same way that the

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[24] Seargent, 227.

[25] Ibid.

[26] Ibid., 230.

mathematical structure which constitutes our universe, and whose properties correspond to its physical laws, are instantiated therein."[27] This is a universe wherein all structures exist physically as well as mathematically. In other words, this multiverse ostensibly contains every imaginable universe a mind can imagine and is structured based on unknown sets of physics and other laws.

Besides Tegmark's four-level multiverse theory, there are numerous other multiverse models that are slightly different, and "some invoke models in which a single universe undergoes cycles of expansion and re-collapse, with the constants being changed at each bounce."[28] Advocates of this theory insist that one can "have empirical access only to a tiny part of reality that may not at all be representative of the whole."[29] Accordingly, "this 'multiverse' concept not only posits many other universes, but also various mechanisms for producing these universes."[30] Allegedly, with this model, a life-sustaining universe is highly probable, considering the possibility of the existence of many universes. Therefore, as per this theory, the universe is neither unique nor special. From the understanding of the many multiverse theories, Hawking claims that a grand designer as a cause of the universe is no longer needed. He is quoted by Lennox saying:

> Our universe and its laws appear to have a design that both is tailor-made to support us and, if we are to exist, leaves little room for alteration. That is not easily explained and raises the natural question of why it is that way. . . The discovery relatively recently of the extreme fine tuning of so many of the laws of nature could lead at least some of us back to the old idea that this grand design is the work of some grand designer . . . that is

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[27] Ibid.

[28] Bernard Carr, ed., Universe or Multiverse? (Cambridge: Cambridge University Press, 2014), 2

[29] Simon Friedreich, *Multiverse Theories: A Philosophical Perspective* (Cambridge: Cambridge University Press, 2021), 1.

[30] Stephen Meyer, *Return of the God Hypothesis: Three Scientific Discoveries That Reveal the Mind behind the Universe* (New York: Harper One, 2021), 327.

> not the answer to modern science . . . our universe seems to be one of many, each with different laws.[31]

Lastly, the most recent versions of the multiverse "include a combination of eternal inflation and string theory into what is now called 'string theory landscape.'"[32] The inflationary multiverse or the "eternal inflation"[33] hypothesis has taken center stage in recent debates. For example, Meyer explains that in 2003, Alexander Vilenkin and Arvind Borde presented evidence "for a universe that did not rely on Einstein's general relativity or any other energy condition."[34] Rather, this model depended on what Meyer calls "geometric arguments"[35] coupled with Einstein's special relativity theorem. In general, the BGV (Borde, Guth, Vilenkin) model can be applied to all universes with the necessary conditions set by inflationary cosmological model as Meyer presents his explanation from Vilenkin:

> A remarkable thing about this theorem is its sweeping generality. We made no assumptions about the material content of the universe. We did not even assume that gravity is described by Einstein's equations. So, if Einstein's gravity requires some modification, our conclusion will still hold. The only assumption that we made was that the expansion rate of the universe never gets below some nonzero value, no matter how small. [36]

In a simpler form, Vilenkin's theorem suggests that the universe had a beginning wherein space would rapidly expand for a short period of time.

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[31] John C. Lennox, *God and Stephen Hawking: Whose Design Is It Anyway?* (Oxford: Lion, 2010), 147.

[32] Andrei Linde, "A Brief History of the Multiverse," *Reports on Progress in Physics* 80, no. 2 (January 2017): 2, https://doi.org/https://doi.org/10.48550/arXiv.1512.01203.

[33] Erasmus, 20.

[34] Meyer, 125.

[35] Ibid.

[36] Ibid., 126-127.

The plurality of the universe, with all its sub-hypotheses, was not enough to satisfy the objections of skeptics regarding the origin of the universe. Even if there are multiple universes, there is still the unsettled matter of how these multiple universes came into existence. The skeptics came up with more theories – theories that denied the universe had or needed an origin in the first place; one of these theories was the necessity of the universe.

The Necessity of the Universe

Is the universe necessary? A necessary thing is something "that exists no matter what the possible situation obtains" and "its non-existence at any time would be impossible in the strongest sense."[37] In other words, a necessary thing cannot *not* exist. On the other hand, a contingent thing is "one that might not have existed, and if does exist, it is always causally dependent on a prior event to justify its being."[38] It is worth pointing out that the issue of necessary existence is crucial to science, philosophy, ontology, and cosmology. As Bryce Hardy reminds us, Hawking once noted that his main objective as a physicist is to fully understand the universe, "what it is and why it exists at all."[39] Moreover, Hardy cites Carroll (who agrees with Hawking): "We are looking for a complete, coherent, and simple understanding of reality."[40]

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[37] Alexander Pruss and Joshua L. Rasmussen, *Necessary Existence* (Oxford: Oxford University Press, 2018), 1.

[38] Bryce E. Hardy, "Is God the Necessary Being?" *Quaerens Deum: The Liberty Undergraduate Journal for Philosophy of Religion* 3, no. 1 (Liberty University, 2017), 3.

[39] Stephen Hawking, quoted in Bryce E. Hardy, "Is God the Necessary Being?" *Quaerens Deum: The Liberty Undergraduate Journal for Philosophy of Religion* 3, no. 1 (Liberty University, 2017), 3.

[40] Sean Carroll, quoted in Bryce E. Hardy, "Is God the Necessary Being?" *Quaerens Deum: The Liberty Undergraduate Journal for Philosophy of Religion* 3, no. 1 (Liberty University, 2017), 3.

Craig explains that in his Leibnizian model, the German philosopher, G.W.F. Leibniz, argued for a "Sufficient Reason for the universe"[41] and argued that the most important question should be that of why things exist: "Why is there something rather than nothing?"[42] He insisted that everything must have a sufficient reason for its existence. In other words, every state of affairs must be rationally explained. Regarding the existence of the universe, the reason for or the cause of the universe must be an outside cause, not contingent on anything, and does exist necessarily. As a result, the explanation for the universe's existence is that its cause has to be outside of the universe.

Those who reject the Leibnizian model argue that the universe exists as a fundamental dependent thing. The assumption is that since God does not exist, the universe does not need a cause for its existence because it exists inexplicably. The argument can be thus explained:

1. If there is no God, and atheism is true, the universe does not need an external explanation for its existence.
2. If God exists, then atheism is false, and the universe needs an extrinsic explanation for its existence.

Premise (2) implies that the cause of the universe (or its explanation) must be transcendent, spaceless, timeless, and immaterial (cannot be part of the universe). However, there are only two kinds of realties that fit the description: minds and abstract objects, such as numbers. Skeptics of the Leibnizian model reject the notion that a mind or a soul is the cause of the universe, and instead, they argue that although it is true that according to premise (1), the universe still must

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[41] William Lane Craig, *Reasonable Faith: Christian Truth and Apologetics,* 3rd ed. (Wheaton, IL: Good News Publishers: Crossway Books, 2009), 99.

[42] Ibid.

have some explanation for its existence, the explanation is internal (rooted in the necessity of the universe's own nature.) Thus, the universe is contingent upon itself. In other words, the universe cannot possibly have an explanation for its existence because the explanation itself must be prior to the existence of the universe. Yet, according to this view, there was nothing prior to the existence of the universe and "nothingness" cannot be the explanation for the universe. Skeptics, then, propose a "God-substitute that exists necessarily."[43] In addition, if the universe has an explanation for its cause, that explanation does not hinge on an outside cause, but rather, in the necessity of the universe itself. Bede Rundle points out:

> It will doubtless be agreed that you cannot have "before the universe existed, there was nothing"; there is no "before"; a point appreciated by Augustine, who held that the world was not created *in* time but *with* time. For the same reason, you cannot interpret "the universe had a beginning" as meaning that at one time there was nothing, and then the universe came into being. The notion of something's having had a beginning concerns a state of affairs which is intelligible only as occurring within the universe.[44]

Hence, coming into existence could very well be an external condition to the universe. It is not accurate to suggest that the emergence of the universe is the result of a developed event. This assumption is false because the explanation for the existence of the universe is that the explanation is within itself.

Although the Big Bang model is a widely accepted and standard cosmological model among physicists today, as I mentioned earlier, a growing number of scientists still reject the very beginning of the universe, with the consequent rejection of Kalam cosmological argument's second premise (the universe had a beginning), and instead propose alternate models for an infinite universe that has always existed necessarily, without a cause. One way to establish the

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[43] Craig, *On Guard*, 60.

[44] Bede Rundle, *Why There Is Something Rather Than Nothing* (New York: Clarendon Press, 2004), 121.

necessity of the universe's existence is to propose a model that would describe the events prior to the Big Bang. If it can be demonstrated that certain events took place before the fireball explosion of the Big Bang, then it would be possible to suggest that the universe did not start at the Big Bang singularity as currently believed. In other words, if the universe exploded into existence at t=0, then the events at t=-0 would eliminate the necessity for a beginning to the universe, and the assumption can be made that the universe exists necessarily.

Michio Kaku, the Japanese American theoretical physicist, who is an expert in string theory, presents such a model wherein he insists that it is only through the unification of Einstein's general relativity with quantum theory that pre-Big Bang events can be analyzed. According to his super string theory, the four fundamental forces[45] of the universe were unified at the Big Bang by a moment known as "the era of grand unification."[46] In addition, "the four dimensions of which we are aware – three spatial dimensions and time – were once combined with six other dimensions."[47] The reason these six other dimensions are no longer detected is because the ten erratic dimensions "cracked" into two separate sets of dimensions (a set of four and another set of six), thereby leaving only four detectable universal dimensions. Thus, the Big Bang itself is nothing but an effect or an "aftershock of a much larger and much greater cataclysm – the cracking of space and time itself."[48]

Paul Davies agrees with Kaku's model and adds that quantum mechanics make it possible for things to pop into existence out of nothing, thereby eliminating the necessity for a

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[45] These are the force of gravity, the force of electromagnetics, the weak nuclear forces, and the strong nuclear forces.

[46] Silk, 115.

[47] Michael George, "Michio Kaku's Religion of Physics," *World Futures Review* 3, no. 3 (2011): 20.

[48] Ibid.

cause to bring the universe into existence. Because (allegedly) quantum fluctuations do not require causes, Davies argues that the universe has no cause, thus, it exists necessarily. As a result, if one Big Bang is possible, then many or even an infinite number of Big Bangs going all the way to infinity are also possible. Davies goes on to explain that "if time did not exist before the Big Bang, the concept of a prior physical cause is meaningless" and that "asking what was there before the Big Bang is, as Hawking once put it, like asking what lies north of the North Pole."[49] Thus, it is reasonable to conclude that there is no such place as "north of the North Pole"[50] just like there is no "time before time began." If so, that would mean the universe is timeless, without an outside cause. In other words, the universe's existence is within itself—it exists by necessity.

However, the necessity of the universe is not the final view atheists hold, they also maintain a third and a final contentious hypothesis that realities can pop into existence uncaused, and that things can come into existence from nothing, just like the universe.

The Aseity of the Universe

Is the universe self-existent? Aristotle was so troubled by the principle of first cause that he proposed a universe that is eternal, both in the past and in the future. Aristotle's view has been favored by most modern physicists. Arthur Koestler, for example, argues that because chance reigns supreme, "God is an anachronism."[51] R.C. Sproul and Keith Mathison cite the Nobel Laureate George Wald who echoes Koestler and explains that the universe does not need a cause

[49] Paul Davies, *What's Eating the Universe? And Other Cosmic Questions* (Chicago: University of Chicago Press, 2021), 114.

[50] Ibid.

[51] Arthur Koestler, *Darkness at Noon*, trans. Daphne Hardy (New York: Bantam, 1941), 149.

because its explanation is withing itself. He insists that patience is key when it comes to the universe creating itself from nothing because "time itself performs the miracle."[52] Sproul and Mathison also quote Bertrand Russell (who agrees with Wald): "There is no reason why the world could not have come into being without a cause."[53]

The aseity of the universe, or the idea that the universe created itself, is a controversial view supported by many physicists and astronomers who reject the creation model of the universe, and instead insist that it is possible for something to appear out of nothing. Richard Dawkins, Sam Harris, Peter Atkins, Stephen Hawking, and others have come to adopt this belief and even sometimes affirm it as a scientific fact. Hawking takes it a step further and explains that physical laws can produce a universe out of nothing: "Because there is a law such as gravity, the universe can and will create itself from nothing. Spontaneous creation is the reason there is something rather than nothing, why the universe exists, why we exist. It is not necessary to invoke God to light the blue touch paper and set the universe going."[54] According to Hawking, the emergence of the universe from nothing can be explained by the "no boundary condition" (Hartle-Hawking model) and another principle of an imaginary time within the boundary. Here, the universe never had a beginning at singularity, but rather, it endured a space-time curve, thus eliminating the need for a beginning. If one were to draw a space-time singularity model, the best representation would perhaps be an ice cream cone shaped figure that has a tiny point of beginning at the end. However, in the no boundary model, there is no point of beginning at the

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[52] R. C. Sproul and Keith Mathison, *Not a Chance: God, Science, and the Revolt against Reason* (Grand Rapids, MI: Baker Books, 2014), 28.

[53] Ibid., 172.

[54] Stephen Hawking and Leonard Mlodinow, *The Grand Design* (New York: Bantam Books, 2010), 180.

end of the cone, but rather, the end is smoothed out and curved. In other words, the universe has no boundary, just like a basketball's rounded surface lacks an edge.

Hartle-Hawking "No Boundary Model"

Image (1:1)[55]

Unlike the starting point in a space-time singularity (beginning of the universe via the Big Bang), argue Hawking and Penrose, as one gets closer to the "smoothed out" end of the universe, physical sub-atomic particles begin to appear and disappear out of nowhere while space and time separate from each other. In other words, "the boundary condition of the universe is that it has no boundary."[56] Thus, time becomes unlike anything that is known traditionally on earth, and therefore, it is meaningless to claim that it had a beginning. Copan and Craig cite Hawking, who claims that his cosmogonic model can infer a universe out of nothing. Hawking writes: "One can interpret the functional integral over all compact four-geometries bounded by a given three-geometry as giving the amplitude for that three-geometry to arise from a zero three geometry;

[55] EVIDENTone9teen, "Does No Boundary Mean No Creator? Stephen Hawking Vs William Lane Craig," YouTube video, 25:16, August 24, 2019, https://www.youtube.com/watch?v=SccjUqVyQYM.

[56] Stephen Hawking and Roger Penrose, *The Nature of Space and Time* (Princeton, NJ: Princeton University Press, 1996), 79.

that is, a single point. In other words, the ground state is the probability for the Universe to appear from nothing."[57] Andrew Ter Ern Loke states: "The universe has a beginning in real time at the Big Bang. But the initial state of the universe is, in Hawking's words, in 'another kind of time, imaginary time, at right angles to real time, in which the universe has no beginning or end.'"[58] It is worth mentioning that, according to the Hartle-Hawking boundary conditions, universes can always appear from nothing, as long as the total sum of negative energy and gravity is zero.

The famed American astrophysicist, Neil deGrasse Tyson, does not dismiss the Hartle-Hawking no-boundary model. Instead, he expresses that it is very possible that the universe created itself and that no religious person should assume a divine cause. He asks the following question: "But what if the universe was always there, in a state or condition we have yet to identify—a multiverse, for instance? Or what if the universe, like its particles, just popped into existence from nothing?"[59] He adds that there is no divine beginning to the universe because "in the beginning, there was physics,"[60] and that it is only through the laws of physics that the chemical and biological origin of everything can be understood.

Not surprisingly, the notion that particles in physics can pop into existence out of nothing has been widely accepted by modern physicists. Krauss, like deGrasse, argues that quantum

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[57] Stephen Hawking, quoted in Paul Copan and William Lane Craig, *The Kalam Cosmological Argument* (London: Bloomsbury Academic, 1983), 137.

[58] Andrew Ter Ern Loke, *God and Ultimate Origins: A Novel Cosmological Argument* (Cham, Switzerland: Palgrave Macmillan, 2017), 163.

[59] Neil deGrasse Tyson, "In the Beginning," *Natural History Magazine*, September 2003, accessed August 27, 2022, https://www.haydenplanetarium.org/tyson/essays/2003-09-in-the-beginning.php.

[60] Neil DeGrasse Tyson and Donald Goldsmith, *Origins: Fourteen Billion Years of Cosmic Evolution* (New York: W. W. Norton & Company, 2004), 1.

vacuum fluctuations were the reason the universe came into existence. He explains that there are things that appear, without a cause and out of nowhere, every day. No creator is needed to explain these phenomena: "Every day beautiful and miraculous objects suddenly appear, from snowflakes on a cold winter morning to vibrant rainbows after a late-afternoon summer shower."[61] Thus, fiery, radical fundamentalists should not suggest a divine intelligent creator as the cause of these natural affairs. Likewise, the physical laws of the universe are the reason the universe exists, evolves, and develops. Humans are merely the product of these laws – humans are "star dust."[62]

In sum, Krauss believes that quantum mechanics reigns supreme because thanks to quantum gravity, it is a requirement that a universe can be created from nothing. As far as the origin of these physical laws, Krauss insists that the laws either are eternal or have come into existence through other natural forces (either option excludes the possibility of intelligent design). Therefore, Krauss stresses that the ultimate question should be how, rather than why, there is a universe in existence. According to Krauss' viewpoint, it is more scientifically accurate to ask the "how" question than the "why" question because the "why" question implies that the universe exists for a purpose. Physical laws would not be able to explain this purpose; physical laws can only answer the "how" question. For example, one should not ask "why is the sun hot?" but rather, "how is the sun hot?" In other words, what physical and natural laws caused the sun to be hot?

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[61] Lawrence Maxwell Krauss, *A Universe from Nothing: Why There Is Something Rather Than Nothing* (New York: Atria Paperback, 2013), 25.

[62] Ibid., 17.

Regarding the origin of the universe from nothing,[63] Krauss first proposes various meanings for "something from nothing."[64] He explains that, based on Occam's razor, a physically plausible explanation is more plausible than other extraordinary explanations. Accordingly, positing a powerful, intelligent, divine being as the explanation for the universe, rather than a simpler and more reasonable explanation, such as the aseity of the universe or the multiverse hypothesis, would be such an extraordinary explanation, and thus should be eliminated.

Krauss also rejects the premise that "nothingness" denotes "nonbeing" because when a pair of an electron and positron suddenly pop into existence out of nothing and land near the nucleus of an atom, they affect the fundamental properties of such atom for the time the pair exist. However, before their appearance near the nucleus, in no sense did the pair exist. Even if the pair were to exist potentially, that does not mean they existed actually. Krauss writes: "In what sense did the electron or positron exist before? Surely by any sensible definition they didn't. There was potential for their existence, certainly, but that doesn't define *being* any more than a potential human being exists because I carry sperm in my testicles near a woman who is ovulating, and she and I might mate."[65] In other words, Krauss believes that the probability of existence is not the same as existence. Just because something exists in potentiality, that does not mean it exists in actuality. The nothingness Krauss is concerned with is the simplest definition,

[63] Krauss argues that his definition of nothing is based on empirically verifiable realities rather than philosophical propositions. He admits that the existence of matter from nothing seems illogical to many people, and it even violates the scientific law of conservation of energy. However, he explains that no one should rely on common sense to understand nature. The universe should shape our common sense and not the other way around. Therefore, science and the laws of nature permit for forces such as gravity and quantum mechanics to produce a universe out of nothing, even if the process defies logic and reason.

[64] Krauss, *A Universe from Nothing,* 146.

[65] Ibid.

empty space void of anything. He attempts to back up his definition with similar definitions proposed much earlier by Plato and Aquinas. In any case, during the rapid expansion of the universe in empty space, energy grows with space itself "without the need for any *hocus pocus* or miraculous intervention."[66] He claims that what makes this process possible is the negative gravitational pressure that releases energy into the empty space as the universe expands. Thus, when inflation stops, the stored energy in the empty space is transformed into heat energy and radiation, thereby forming the traceable infancy stages of the Big Bang. As per this claim, empty space and quantum fluctuations (nothingness) in the beginning will cause everything else in the universe, including life on earth, to come into existence (this contradicts the Kalam cosmological argument's second premise: that there must be an outside cause, and that nothingness cannot spontaneously cause anything to come into existence).

When these processes are done, the universe will be left essentially flat,[67] wherein the standard gravitational force of all objects will equal zero. In other words, the entire universe can arise out of nothing from a tiny region in the empty space and eventually contain the required amount of matter and radiation needed for everything in existence today. He continues to claim that the flatness of the universe and the zero Newtonian gravitational energy shows that the

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[66] Ibid., 150.

[67] According to Einstein's theory of general relativity, space is curved. Thus, it can be a sphere (positively curved), it can be like a bowl or a saddle (negatively curved), or it can be flat (like a sheet of paper). Unlike a curved universe that has zero curvature, a flat universe is a space-time wherein light remains perpendicular as it travels in straight lines in perpendicular axes (x, y, z). Basically, a flat universe is precisely tuned to possess the right amount of mass so that it will neither expand forever nor implode on itself. According to Euclidian geometry, if you walk in a square room along the four 90-degree corners, you will eventually return to your starting point after passing all 90-degree corners. Thus, you can conclude that your room is flat. The same scenario is applied to the universe. If it were curved, the temperature variations resulting from the cosmic background microwave radiation (Big Bang heat energy) would have been distorted. If the universe were closed, light coming from the hot spots of the cosmic radiation would bend closer to each other and would make the hot spots appear larger than what they really are. If the universe were open, light from the hot spots would bend farther away from each other, making the hot spots look smaller to us. However, if the universe were flat, the coming light would not bend at all, and the hot spots would appear to us as their actual sizes.

universe is the result of a process of energy of nothingness (empty space) converting into the energy of quantum particles that eventually form everything in the universe. Consequently, nothing can produce something, if only for a moment.

Krauss also argues that the biggest obstacle the biblical doctrine of creation *ex nihilo* faces is that it presupposes an outside cause or an agent that is not within the system itself to preexist first in order to create a system that would eventually produce a universe. He objects to the notion of God being the cause or the outside agent responsible for the existence of the universe and its rules. Appropriately, one should wonder about these rules that God supposedly created and ask, who, or what approved these rules?

As a result of these questions, Krauss writes that God, as the first cause, is no longer a necessary explanation for the existence of the universe because the laws that govern the universe are themselves the cause. With a typical atheist audacity, he insolently ridicules the theists' contention that "nothing produces nothing" or that "out of nothing something cannot come," and cautions them from engendering difficult questions like God causing existence ex-nihilo, if indeed "nothing can come out of nothing" (a clear betrayal on his part, of confusion of natural limitations for supernatural limitations). He rejects the notion that nature cannot do what God can do because natural potential for existence is analogous to supernatural potential for existence.

Instead of positing a spaceless, timeless, immaterial God as the cause of everything in existence, Krauss favors the universe itself as the better candidate, believing that it provides adequate and plausible solutions to the biggest questions of existence. For instance, he uses the multiverse theory to explain a possible first cause; he also considers the possibility of other universes with separate and distinct governing physical laws through which the nature of

existence can be better understood. Allegedly, the existence of these possibilities renders the universe useless and meaningless. There is neither anything unique about the solar system nor profound about earth. Mere cosmic calculations enabled life to exist on Earth and not on Mars. According to his theory, multiverses emerging via eternal inflation within extra dimensions of space can provide better possibilities for life to emerge out of nothing.

Conclusion

The views discussed in this chapter clearly show that most physicists and cosmologists today not only doubt the standard Big Bang model, but also believe that there are alternate models that better explain the origin of the universe. The eternality of the universe, the aseity of the universe, and the necessity of the universe are some of the alternate theories modern scientists propose to avoid a universe with a beginning. The common denominator amongst these models is rejection of a first cause that brought forth the universe into existence. If the universe is eternal, then it has always existed, and therefore a creator is not needed. If the universe is necessary, then the explanation for its existence is within the universe itself, and thus no outside cause is necessary to create the universe. If the universe is self-creating, then positing a divine God who created the universe *ex nihilo* is meaningless.

However, there is a plethora of scientific and philosophical arguments that clearly demonstrate the contrary. In the following chapter, five scientific discoveries and one philosophical argument will be discussed to show that the universe is not eternal, could not have created itself from nothing, and that the best explanation for its existence is an outside first cause. The scientific and philosophical evidence for the second premise of the Kalam cosmological argument will be discussed in detail. Because of the importance of the evidence, and the fact that

the second premise is the main thesis of the paper, this chapter will be longer, and more detailed than the rest.

CHAPTER THREE

THE DEFENSE OF THE KALAM COSMOLOGICAL ARGUMENT'S SECOND PREMISE

The second premise of this cosmological argument states that the universe had a beginning. According to Geisler and Turek, an effective way to summarize this premise is the acronym "SURGE wherein S stands for the second law of thermodynamics, the U stands for the universe expanding, the R stands for the radiation from the Big Bang, G stands for the great galaxy seeds, and E stands for Einstein's theory of general relativity."[1] Since all these factors point to a universe with a beginning, they deserve appropriate explication, which I now endeavor to present.

Second Law of Thermodynamics

The second law of thermodynamics states that heat always moves from hotter to colder objects. Left on its own a natural process deteriorates from order to disorder. Stated differently, the total entropy of a system either increases or remains constant in any spontaneous process. The universe is evidently in a constate state of disorder, meaning that it is losing energy (degenerating from order to disorder). As Padgett opines, when energy is converted from one form to another, some energy will be lost in the process.[2] This shows that if the universe were a stance akin to eternal, it would have run out of energy a long time ago. The reason it has not is that it has not existed eternally. Moreover, if the universe contains a certain amount of energy, it

[1] Norman Geisler and Frank Turek, *I Don't Have Enough Faith to Be an Atheist* (Wheaton: Crossway, 2004), 72.

[2] Alan Padgett, *Science and the Study of God* (Grand Rapids: Eerdmans, 2003), 126.

is reasonable to assume that it will eventually use up all its energy and come to an end. Paul Davies explains:

> If the universe has a finite stock or order, and is changing irreversibly towards disorder – ultimately to thermodynamic equilibrium – two very deep inferences follow immediately. The first is that the universe will eventually die, wallowing, as it were, in its own entropy. This is known among physicists as "heat death" of the universe. The second is that the universe cannot have existed forever, otherwise it would have reached its equilibrium end state an infinite time ago…[3]

The best way to understand the second law of thermodynamics is to make an analogy: A fully lit candle in a room will eventually lose all its energy, and it will no longer emit light. The longer the candle stays lit, the more energy it will lose. Therefore, it cannot preserve its limited energy and emit light forever. As a result, the conclusion is that this candle in the room has not been emitting light eternally. Craig notes:

> If you had a bottle that was a closed vacuum inside and you injected into it some molecules of gas, the gas would spread itself evenly throughout the bottle. The chances that the molecules would all huddle together in one corner of the bottle are practically nil. This is because there are many more ways in which the molecules could exist in a disorderly state than in an orderly state.[4]

What is interesting about Craig's observation is that, like the gas in the bottle, given enough time, all the available energy in the universe will eventually spread evenly throughout the vast universe. Once that state is reached, the universe will be in a state of heat death or what Craig calls a "state of equilibrium in which the temperature and pressure are the same everywhere."[5]

This state of entropy, however, generates a paradox: if the universe were eternal, as some scientists claim, why is it not now in that state of heat death? Craig raises the question: "If in a

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[3] Paul Davies, *God and the New Physics* (New York: Simon and Schuster, 1983), 10.

[4] William Lane Craig, *On Guard: Defending Your Faith with Reason and Precision* (Colorado Springs, CO: David C. Cook, 2010), 93).

[5] Ibid.

finite amount of time, the universe *will* reach equilibrium, then, given infinite past time, it should by now *already be* in a state of equilibrium. But it's not. We're in a state of disequilibrium, where energy is still available to be used and the universe has an orderly structure."[6] Craig further explains that equilibrium is the state wherein the four forces of nature are perfectly balanced and changeless. Equilibrium in the universe then occurs when pressure and temperature are equal everywhere and thus, there are no stars, no galaxies, and no planets. In summary, an eternal universe is a logical impossibility.

Similarly, if the universe were eternal, just like the candle, it would have run out of energy by now. The second law of thermodynamics is so tightly agreed upon by most physicists that no one objects to its validity anymore. Paul Davies quotes Arthur Edington, who explains the following: "The Law that entropy increases—The Second Law of Thermodynamics—holds, I think the supreme position amongst the laws of nature."[7] According to the astronomer Robert Jastrow, the universe is like a "wound-up clock."[8] If this clock is running down, then someone must have "wound it up."[9] Craig concludes: "the scientific evidence for thermodynamics confirms the truth of the second premise of the Kalam cosmological argument. This evidence is especially impressive because thermodynamics is so well understood by physicists that it is practically a completed field of science."[10] Thermodynamics[11] is a settled matter.

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[6] Ibid.

[7] Arthur Edington, quoted in Paul Davies, *The Cosmic Blueprint* (New York: Simon & Shuster, 1988), 48.

[8] Robert Jastrow, *God and the Astronomer* (New York: Norton, 1978), 48.

[9] Geisler and Turek, 74.

[10] Craig, *On Guard,* 98.

[11] Although the first law of thermodynamics states that the amount of energy is constant "energy can neither be created nor destroyed," [Geisler and Turek, *I don't have enough faith to be an atheist*, 2004, 75] there is no proof that energy was not created in the initial stages of the origin of the universe.

The Expansion of the Universe

One of the most important discoveries that supported evidence for an expanding universe was the discovery of the red shift. Along with Einstein's new theory of general relativity, these two hypotheses became irrefutable evidence that pointed to a universe that was expanding from a finite past. Ironically, Einstein initially rejected the idea of an expanding universe. Eventually, his mathematical equations and the other scientific discoveries in favor of an expanding universe made it impossible for Einstein to further dismiss the evidence. Einstein was not alone in his rejection of an expanding universe. Meyer quotes Arthur Eddington, who agreed with Einstein: "Philosophically, the notion of a beginning of the present order is repugnant to me."[12] He further added that he wished to find a way around the notion of a universe with a beginning. He even admitted that the idea of an expanding universe left him "cold."

Few physicists acknowledged the reason most scientists rejected the idea of an expanding universe. According to Meyer, Princeton University physicist Robert Dicke, for example, understood the reason why so many of his colleagues opposed the Big Bang expansion. He claims that an infinite universe with no beginning would "relieve us of the necessity of understanding the origin of matter at any finite time in the past."[13] A finite universe would ultimately force skeptical scientists to face the reality of a material universe with an actual beginning. Furthermore, a finite universe would open wide the possibility of a cause outside of space, time, and matter dimensions—a cause such as God.

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[12] Sir Arthur Edington, quoted in Stephen Meyer, *Return of the God Hypothesis: Three Scientific Discoveries That Reveal the Mind behind the Universe* (New York: Harper One, 2021), 96.

[13] Stephen Meyer, *Return of the God Hypothesis: Three Scientific Discoveries That Reveal the Mind behind the Universe* (New York: Harper One, 2021), 97.

Consequently, in the last part of the twentieth century, most physicists proposed alternate hypotheses to the Big Bang cosmology in hopes of reviving the infinite universe hypothesis. In 1948, Fred Hoyle, Herman Bondi, and Thomas Gold proposed the "steady-state model"[14] wherein the universe "expands, new matter is generated spontaneously in the space between expanding galaxies."[15] Likewise, "the universe is unchanged and will remain unchanged throughout eternity."[16] In addition to the steady-state model, physicists proposed that the matter the Milky Way galaxy had come into existence "in between other galaxies that had in turn emerged from the empty space between galaxies, and so on."[17] Meyer reiterates Hoyle's point that the main objective of their attempts was to "circumvent what were to him the obvious theistic implications of the Big Bang theory."[18] What these three scientists described was a universe that had been expanding from eternity in space and matter and would continue expanding forever.

Further, Meyer explains that it was a movie that led to the idea of the steady-state model. He writes: "Oddly, the steady-state model came to Gold while he was watching a horror movie. The movie included a dream sequence in which the plot appeared to be changing, yet it always ended up exactly where it began."[19] Thus, the three scientists paralleled the movie with the story of the universe. They used the evidence from the red shift that pointed to an expanding universe

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[14] Ibid.

[15] Ibid.,

[16] Robert Jastrow and Malcolm H. Thompson, *Astronomy: Fundamentals and Frontiers*, 2nd ed. (New York: Wiley, 1974), 264.

[17] Meyer, *Return of the God Hypothesis,* 97.

[18] Fred Hoyle, quoted in Stephen Meyer, *Return of the God Hypothesis: Three Scientific Discoveries That Reveal the Mind behind the Universe* (New York: Harper One, 2021), 97.

[19] Meyer, *Return of the God Hypothesis,* 97.

and explained that the universe could expand to twice its actual size. They also argued that given the fact that "doubling an infinite volume just generates another infinite volume, cosmic expansion would not actually change the measurable dimensions of the universe."[20] Just like the horror movie, the dream eventually returned to its point of beginning – an infinitely vast expanding universe.

The steady-state model, however, was not without its challenges. As stated earlier, hydrogen comprises 78% of the matter in the universe. Physicists are unable to explain its origin. Jastrow admits that no one knows the answer to this puzzle. He proposes the question: "who or what put the primordial hydrogen into the universe?"[21] He later admits that scientists do not attempt to answer these questions. As a result of such challenges, and to avoid such difficult questions, Thomas Gold argued that "fresh Hydrogen is steadily created throughout the universe out of nothing."[22] The newly created hydrogen, he explained, would provide the necessary material for the formation of new stars and galaxies.

Well into the 1960s, the steady-state model was the only serious competitor to the Big Bang theory. Meyer argues that the steady-state model was popular amongst scientists for two reasons: First, there was no need to invoke a divine cause to the universe. Second, the Big Bang model was still in its infancy and failed to answer three main inquiries:

1. Early models of the Big Bang theory resulted in an earth that was older than the universe itself. Using early radiometric dating methods, the calculations showed that the earth was 4.5 billion years old, whereas the universe was only 1.9 billion years old.

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[20] Ibid., 98.

[21] Robert Jastrow and Malcom H. Thompson, *Astronomy: Foundations and Frontiers. 2nd ed* (New York: Wiley, 1974, 262).

[22] Ibid., 263.

2. The early Big Bang model did not adequately explain how, after the initial explosion of the Big Bang, lighter elements (hydrogen, helium) eventually produced heavier elements (carbon, oxygen).
3. Although the early Big Bang model predicted the presence of low microwave cosmic background heat which resulted from the fireball explosion, it could not show it.[23]

Although these three difficulties crippled the popularity of the Big Bang model for a while, new discoveries in cosmology paved the path for new solutions. The first difficulty regarding the age of the earth and the universe was believed to have been corrected in 1952 by Walter Baade. His calculations showed that the universe was much older than how it had been measured, "3.6 billion years in age."[24] A few years later, Allan Sandage concluded that bright stars differed in their luminosity levels. Thus, he concluded that the universe was much older than Baade's 5.5-billion-year prediction. The latest scientific measurements confirmed the age of the universe to be roughly 13.8 billion years old. The second difficulty, lighter elements forming heavier ones, was believed to have been resolved by a critic of the Big Bang model, Fred Hoyle. He introduced the "triple-alpha process"[25] wherein he showed that "massive stars could synthesize carbon from lighter elements via series of nuclear reactions."[26] As a result, his

[23] An illustration may help to make sense of this paradox: Suppose a mother roasts a chicken for dinner. When it is done, the mother pulls the bird out of the oven and lays it on the kitchen counter to cool off. She then proceeds to close the oven door. Expectedly, the bird will continue to radiate heat energy throughout the kitchen, thus raising the temperature in the room slightly, by an unnoticeable amount. Similarly, the initial fireball explosion of the Big Bang would have resulted in a dispersed heat energy throughout the universe as it expanded. The conundrum is that the early universe lacked any matter in a solid state (like the chicken). It only contained hot plasma. From where did the cosmic background radiation originate?

[24] Meyer, *Return of the God Hypothesis,* 101

[25] Ibid.

[26] Ibid.

solution to the second difficulty provided evidence for the accuracy of the Big Bang model that he had rejected earlier.

The last obstacle to the Big Bang is believed to have been resolved in 1965 when Arno Penzias and Robert Wilson accidently discovered the predicted low-energy cosmic heat waves, CMBR (Cosmic Microwave Background Radiation). After their discovery, "they contacted Robert Dicke at Princeton, who himself had been looking for the CMBR."[27] After examining the data, he concluded that Penzias and Wilson had discovered the radiation left over from the initial fireball explosion of the Big Bang some 13.8 billion years ago. As a result of these calculations and corrections, most scientists (apart from Hoyle) abandoned the steady-state theory and favored the new Big Bang model.

In the 1970s, the Big Bang model reigned supreme amongst other models. The discovery of the CMBR virtually ended any support for the steady-state hypothesis. However, a final problem lingered for supporters of the Big Bang–viz., galaxy formation. Galaxies could only form if "the mass and energy just after the Big Bang must have exhibited fluctuations in density."[28] Early calculations showed that these variations did not exist. Even ground instruments and test rockets failed to register the predicted changes. However, in 1989, NASA launched the COBE (Cosmic Background Explorer) satellites into space to look for slight variations in the CMBR. COBE roamed the orbit around the earth and eventually discovered the predicted variations. COBE's findings removed one of the few remaining challenges to the Big Bang model. Additionally, it "sealed the case from observational astronomy for a finite

[27] Ibid., 103.

[28] Ibid., 106.

universe."[29] These findings startled the scientific community. They were so extremely significant that George Smoot, the director of the COBE program, compared them to "seeing God."[30]

The results of these findings from the last decade are agreed upon unanimously by most physicists today. It is now widely believed that the universe exploded into existence in a phenomenon like the Big Bang from nothing. Physicists believe that when it was only 10^{-34} seconds old, "(a hundredth of a billionth of a trillionth of a trillionth)"[31], it went through a tremendous burst of expansion wherein space itself expanded faster than the speed of light. According to modern cosmologists, "the universe began its existence as an extremely hot and dense concentration of matter."[32] This hot soup of cosmic matter was later named "*ylem*"[33] by George Gamow, who borrowed the term from Aristotle. The Greeks believed that all the matter in existence derived out of "basic substance"[34] called "*ylem*."

Robert Jastrow explains that the *ylem's* temperature would have been trillions of degrees high. Eventually, as the universe expanded rapidly, the temperature decreased from billions of degrees to millions. When the temperature finally settled at 10 million degrees, "protons or hydrogen nuclei would have begun to stick together in groups of four to form helium nuclei through nuclear reactions."[35] As a result, during the early stages of the expansion, it was calculated that around ten percent of the existing hydrogen in the universe had been converted to

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[29] Ibid., 107.

[30] Ibid.

[31] Ibid.

[32] Jastrow and Thompson*, Astronomy*, 261.

[33] Ibid.

[34] Ibid., 262.

[35] Ibid.

Helium. The theory goes to the effect that, after the formation of Helium, the universe continued to expand, and its temperature dropped even more. At this stage, the formation of atoms was not yet possible because "whenever an electron was captured, into an orbit around a nucleus of an atom, it was knocked out of orbit almost immediately under the smashing impact of the violent collisions that occur at such high temperatures."[36] According to this theory, when the universe reached the age of 100 thousand years, its temperature decreased to 5,000 degrees, and "neutral atoms began to form in increasing numbers"[37] Eventually, the continued expansion of the universe and the rapid decrease in its temperature allowed for the formation of galaxies and later stars.[38] To reach the state that it is in today, based on Jastrow's theory, it took the universe 13 billion years[39] of expansion. According to modern cosmologists, this expansion will continue forever. As the universe continues expanding, the distances between galaxies will increase. The hydrogen will be used up, and "the galaxies themselves will grow dimmer and eventually fade out entirely."[40] In the end, the universe will face its cosmic fate when it reaches heat death. The universe will no longer contain any matter or energy, which in turn will virtually end all forms of life everywhere.

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[36] Ibid.

[37] Ibid., 263.

[38] According to Jastrow, the formation of galaxies occurred when the universe was around 100 million years old.

[39] Jastrow explains that at its infancy, the universe expanded at rates greater than recent expansion. Moreover, the fast, outward moving galaxies were affected by the backward gravitational pull. Therefore, there were periods of slowing down in the universe expansion that have not been calculated yet. As a result, he argues that the 13-billion-year age of the universe is nothing but an assumption because it is impossible to estimate the age of the universe precisely.

[40] Meyer, 262.

Although recent cosmological discoveries solved most of the Big Bang challenges, there remained an issue that continued to puzzle physicists: the abundance and origin of hydrogen. Meyer repeats the question posed by Jastrow: "Who or what put the primordial hydrogen into the universe?"[41] Ironically, Jastrow himself answers the question and writes that astronomers do not try to answer such questions. This answer, however, was unsatisfactory to several cosmologists who sought to find the answer to this puzzle.

Additionally, Meyer explains that a Cambridge student, Thomas Gold, proposed a controversial idea that hydrogen is created out of nothing throughout the universe regularly. Gold added that this newly created hydrogen is the source for all the other materials needed for the formation of new stars and galaxies. Moreover, as galaxies move away from each other, hydrogen would fill the space in between the moving galaxies. As a result, creation of hydrogen out of nothing also makes it possible for the universe to pop into existence out of nothing. Gold's conclusion was that the universe is eternally immutable.

Gold immediately consulted his colleagues, Herman Bondi and Fred Hoyle, who measured the proper amount of hydrogen required yearly to keep the density of matter constant throughout the universe. Their conclusion was that "the expanding universe remains in a steady state, with constant density of matter, if one hydrogen atom is created per year in a volume equal to that of the Empire State Building."[42] Ironically, these three scientists ignored and violated one of the most fundamental laws of physics: the principle of the conservation of matter and energy. According to this first law of thermodynamics, matter and energy can neither be created nor

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[41] Robert Jastrow, quoted in Stephen Meyer, *Return of the God Hypothesis: Three Scientific Discoveries That Reveal the Mind behind the Universe* (New York: Harper One, 2021), 262.

[42] Ibid.

destroyed. Energy and matter can be produced from one another, but the sum of all matter and energy throughout the universe always remains the same.

Gold's theory was difficult to accept, considering these obvious scientific violations. The violation was so obvious that Meyer explains that even Jastrow himself rejected it: "It seems difficult to accept a theory that ignores such a firmly established fact of terrestrial experience. Yet, the proposal for the creation of matter out of nothing possesses a strong appeal, since it permits us to contemplate a universe that extends into the past and the future without limit, a universe that renews itself *perpetuum*."[43] It would seem, then, that wishful thinking, rather than scientific validity, was the main support for accepting Gold's theory.

Even the great Stephen Hawking admits that the discovery of the expansion of the universe is one of the greatest triumphs in modern cosmology. It was a discovery that virtually ended all debate about a static universe. Ironically, Hawking explains that "Newton and others should have known that a static universe would soon start to contract under the influence of gravity."[44] However, because of the dogmatic belief in a static universe, most physicists failed to consider other models well into the twentieth century.

Newton was not alone in his shortcomings; Einstein was just as guilty of such errors. Because of his strong belief in a static universe, he modified his general theory of relativity and introduced a "so called cosmological constant,"[45] a "fudge factor"[46] into his equations. While Einstein and others were busy trying to find ways that would make general relativity confirm a

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[43] Ibid.

[44] Stephen Hawking, *A Brief History of Time* (New York: Bantam, 1988), 41.

[45] Ibid., 42.

[46] Geisler and Turek, *I Don't Have Enough Faith to Be an Atheist,* 70.

static universe, others, such as Alexander Friedmann, were working on models that would point to a non-static universe. Friedmann proposed two simple explanations for his views: First, no matter the direction, the universe always appears the same. Second, no matter the location, the universe always looks the same. These two views were the pillars of Friedmann's expanding universe model. In fact, what Hubble discovered regarding the expanding universe[47] had been already predicted by Friedmann in 1922.

Today, because of Einstein's general relativity, as well as other scientific discoveries mentioned earlier, the consensus is that the universe is expanding at fantastic speeds. Hawking affirms that at the Big Bang explosion, the universe was infinitely hot and had no size. The further the universe expanded, the less heat energy it contained. According to Hawking, a second after the initial Big Bang, the temperature of the universe went down to ten billion degrees, a temperature so staggering that he calculates it to be "a thousand times the temperature at the center of the Sun."[48] Hawking explains that at this stage, the "antiparticles"[49] of electrons, protons, and neutrons combined with a few protons and neutrons made up mostly of the elements in the universe. Roughly around one hundred seconds after the Big Bang explosion, the temperature would have decreased to a billion degrees. Thus, neutrons and protons combined to form the "nuclei of atoms, of deuterium (heavy hydrogen)."[50] Within hours of the birth of the universe, helium and other materials were no longer being formed. For the next million years, the

[47] Hawking notes that it is possible to measure the current rate of the expansion of the universe through the Doppler effect. This can be done by measuring the speeds at which galaxies are drifting away from each other. Therefore, Hawking proposes that the universe expands 5-10% every 1 billion years.

[48] Hawking, *A Brief History of Time,* 121.

[49] Ibid.

[50] Ibid., 122.

universe continued its expansion and the temperature eventually decreased to only a few thousand degrees. Accordingly, atoms were formed via electromagnetic attraction between electrons and nuclei.

The universe is believed to have continued its state of expansion and cooling down. However, the inward gravitational pull slowed down the denser areas of the universe from expanding further. As a result, no expansion at all occurred in those regions and a "re-collapse" followed. As these regions re-collapsed, so continues the theory, the matter outside these regions started to rotate slightly due to the gravitational pull. The smaller the region was, the faster it began to spin. Hence, the smaller regions spun the fastest just "as skaters spinning on ice spin faster as they draw in their arms."[51] Eventually, the smallest regions spun fast enough to balance off the attraction of gravity, leading to the formation of disk-like galaxies. Other regions which did not rotate became "oval-shaped objects called elliptical galaxies."[52]

As time went on, it is argued, the force of their own gravity broke down hydrogen and helium to form smaller clouds. The atoms in these clouds collided with one another, raising the temperatures of the clouds and resulting in a state of nuclear fusion. More helium would convert from hydrogen, and the heat resulting from it would thus raise the pressure. This process enables stars such as our sun to radiate the energy in the form of heat and light. However, the nuclear fusion reaction in bigger stars happens faster, which (according to this theory) results in hydrogen being depleted in one hundred million years. Heavier elements like oxygen and carbon would be converted from helium. What follows is unclear, as Hawking explains:

> What happens next is not completely clear, but it seems likely that the central regions of the star would collapse to a very dense state, such as neutron star or black hole. The outer

[51] Ibid., 123.

[52] Ibid.

> regions of the star may sometimes get blown off in a tremendous explosion called a supernova, which would outshine all the other stars and its galaxy. Some of the heavier elements produced near the end of the star's life would be flung back into the gas in the galaxy, and would provide some of the raw material for the next generation of stars.[53]

It is true that there are still many aspects of the Big Bang that are unclear, such as the cause of the fireball explosion, the abundance of hydrogen and helium, and the laws that govern the fusion between these elements, to name a few. Hawking admits: "Cosmology cannot predict anything about the universe unless it makes some assumption about the initial conditions. Without such an assumption, all one can say is that things are as they are now because they were as they were at an earlier stage."[54] Based on what is known, the Big Bang is the most reasonable assumption.

The basic summary of this model that most physicists today accept is as follows: In the beginning, the universe contained tremendous energy, and it was infinitely hot and dense. The fireball explosion ignited the expansion of the universe at extraordinary speeds. The result of this rapid expansion was that the universe underwent periods of cooling off accompanied by loss of density—a process that has continued to this day. Subatomic particles were formed within the first few seconds of the Big Bang explosion. When the temperatures dropped to ten thousand degrees, atoms formed. The universe continued to cool off, to expand rapidly, and to have low density levels. Eventually, gas and dust condensed to form galaxies, stars, and planets.

It is worth noting that according to astrophysicist Hugh Ross, "the universe didn't contain the variety and concentrations of heavy elements necessary to make planets and advanced life possible until after three generations of stars formed, burned, and scattered their ashes into the

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[53] Ibid., 124.

[54] Stephen Hawking and Roger Penrose, *The Nature of Space and Time* (Princeton, NJ: Princeton University Press, 2010), 75.

interstellar medium."[55] Another point worth mentioning is that the cause for the rapid expansion of the universe remains a mystery. Ruben Ariona writes: "the explanation as to why the universe is undergoing a period of accelerated expansion still remains an open question and the cause of this phenomenon is usually attributed to a dark energy (DE) component."[56]

Edward van den Heuvel explains that recent "astronomical observations of the past century have shown that we live in an expanding universe that originated a long but finite time ago in an incredibly dense and hot initial state called the Big Bang."[57] According to Arthur Eddington, "the first hint of an 'expanding universe' is contained in a paper published in November 1917 by Prof. W. de Sitter."[58] Eddington adds that "Einstein's general theory of relativity had been published two years before, but it had not yet attained notoriety; it was not until the eclipse expeditions of 1919 obtained confirmation of its prediction of the bending of light that public interest was aroused."[59] Upon reviewing the evidence for the universe's expansion, Einstein later briefed the New York Times and explained that the "new observations by Hubble and Humason concerning the redshift of light in distant nebulae make the

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[55] Hugh Ross, *Why the Universe Is the Way It Is* (Grand Rapids, MI: Gardners Books, 2008), 45.

[56] Rubén Ariona and Savvas Nesseris, *What Can Machine Learning Tell Us about the Background Expansion of the Universe?* (Ithaca, NY: Cornell University Library, 2020), 1, doi:10.1103/PhysRevD.101.123525.

[57] Edward van den Heuvel, *The Amazing Unity of the Universe: And Its Origin in the Big Bang*, 2nd ed. (Cham, CH: Springer, 2016), 1.

[58] Arthur Eddington, *The Expanding Universe* (Cambridge: Cambridge University Press, 1987), 1.

[59] Ibid.

presumptions near [i.e., make it appear likely] that the general structure of the universe is not static."[60] This "redshifting" is a "shift in the spectrum of light emitted by the stars"[61] of galaxies.

In the early twentieth century, Einstein's theory of general relativity predicted an expanding universe. Francis S. Collins explains that initially, he introduced "a 'fudge factor' to block gravitational implosion and retain the idea of a steady-state universe" and "he later called this 'the greatest mistake of my life.'"[62] Moreover, the Belgian astronomer, Georges Lemaitre writes: "Space and time must have had a beginning with a tremendous 'Big Bang' from a 'quantum primeval atom' that produced an ever-expanding Universe with a positive cosmological constant."[63] What is more remarkable is that Hubble's discovery was what Friedman and Lemaitre had precisely predicted regarding the expansion of the universe using Einstein's general relativity model.

This discovery was a breakthrough in the scientific world. John Wheeler notes: "Of all the great predictions that science has ever made over the centuries, was there ever one greater than this, to predict correctly, and predict against all expectation a phenomenon so fantastic as the expansion of the universe?"[64] This is the point: it is obviously not possible for anything to have been expanding eternally, because anything that has been expanding must have had a starting point.

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[60] Ronald Voller, *Hubble, Humason and the Big Bang: The Race to Uncover the Expanding Universe* (Chichester, UK: Praxis Publishing, 2021), 293.

[61] Gerald L. Schroeder, *Genesis and the Big Bang* (New York: Bantam Books, 1992), 72.

[62] Francis S. Collins, *The Language of God: A Scientist Presents Evidence for Belief* (Waterville, ME: Wheeler Pub, 2007), 63.

[63] Georges Lemaître, *Learning the Physics of Einstein with Georges Lemaître before the Big Bang Theory*, ed. Jan Govaerts and Jean-François Stoffel (Cham, CH: Springer International Publishing, 2019), 44.

[64] John A. Wheeler, "Beyond the Hole," in *Some Strangeness in the Proportion,* ed. Harry Wolf (Reading, MA: Addison-Wesley, 1980), 354.

However, it was only in the late twentieth-century that American astronomer, Edwin Hubble, looking through his telescope, shocked the scientific world and confirmed Einstein's prediction. How exactly does this discovery prove that the universe had a beginning? Geisler and Turek explain that "if we could watch a video recording of the history of the universe in reverse, we would see matter in the universe collapse back to a point…that is actually nothing."[65] This single point of origin, which physicists call singularity, was according to Hawking "extremely uniform."[66] Todd Moody explains that at the singularity, "even time itself can't be projected back before this singularity. There is no 'before the singularity' as we think of it.[67] It is also worth noting that "the universe expands not because the matter in the universe is moving further and further apart, but because the distance, say between two galaxies, is increasing of its own accord."[68] Remarkably, what causes the rapid expansion of the universe is a mystery to scientists. Heuvel explains:

> A strange discovery made in 1998, thanks to the measurements of the brightness of very distant exploding stars, is that the empty space of the universe contains the bulk (about 70%) of all energy of the universe. This energy manifests itself by a mysterious force, still not understood, that causes the expansion of the universe to *accelerate*. The remaining about 30% of the energy of the universe (according to Einstein, mass and energy are equivalent) manifests itself as the mass of "real" matter, which exerts gravitational attraction. Of this real matter, only about one sixth is ordinary matter, consisting of atoms and molecules, and five sixths is mysterious Dark Matter, which does exert gravitational attraction, but whose nature is still completely unknown.[69]

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[65] Geisler and Turek, *I Don't Have Enough Faith to Be an Atheist*, 76.

[66] Stephen Hawking and Roger Penrose, *The Nature of Space and Time*, 13th print ed. (Princeton, NJ: Princeton University Press, 2010), 34.

[67] Todd Moody, *Does God Exist? A Dialogue for God's Existence* (Indianapolis: Hackett Publishing, 2013), 19.

[68] John Robson, *Origin and Evolution of the Universe: Evidence for Design?* (Montreal: McGill-Queen's University Press, 1987), 112.

[69] Heuvel, 4.

It is worth mentioning a crucial point regarding the expansion of the universe. Michael Woolfson explains that in 1823, the German astronomer Heinrich Olbers presented a cosmological paradox known as the Olbers' Paradox. He raised a simple concern and questioned the luminosity of the sky: "why is the sky dark at night?"[70] The idea behind Olbers' question was that if the universe were eternal, filled with galaxies and stars everywhere, then it is reasonable to assume that the whole sky should be bright. However, the contrary is true.

The answer to this puzzle is two-fold: First, because of the expansion of the universe, light that is omitted from a faraway receding galaxy leaves the source with a specific wavelength, but because of the Doppler affect, "it is red-shifted and so arrives at Earth with a greater wavelength."[71] As a result, a light beam with a greater wavelength has a lesser energy. Therefore, distant luminous objects in the sky appear less bright than those that are nearer to the observer. Second, as galaxies drift apart from one another, the space between the galaxies expands proportionally. Hence, light arrives at earth at a rate less than the rate of its emission, thus making the galaxies appear less bright. Without the expansion of the universe or the Doppler effect, the universe would be "radiating like the surface of the Sun,"[72] therefore eliminating all forms of life on the planet.

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[70] Michael Woolfson, *Time, Space, Stars and Man: The Story of the Big Bang* (Singapore: World Scientific Publishing Company, 2009), 38.

[71] Ibid., 39.

[72] Ibid.

However, "while some theists and some atheists hold that the singularity supports theism, both atheists and theists have criticized the argument as well."[73] The argument is not just debated between the two groups (theists and atheists), but also internally within each group.

Radiation from the Big Bang

The radiation from the Big Bang is the third line of evidence for an expanding universe. Two employees of the Bell Telephone Research Lab in New Jersey, Arno Penzias and Robert Wilson, were the pioneers who, in 1965, accidently detected strange radiation on their antennas which was believed to be the afterglow from the Big Bang. "These laboratories," says Heuvel, "had in the early 1960s developed a special type of radio telescope—a so-called *horn antenna*—with an opening (*aperture*) of 6 m."[74] When a radio telescope is aimed at the sky and the noise of the receivers from the recorded signal is eliminated, the remaining signals are the noise produced by the radio telescope and noise from the atmosphere. For that reason, Penzias and Wilson pointed their *horn antenna* telescope at a spot in the sky (outside of the Milky Way) that lacked any short-wave radio sources. Their observations "were carried out at a wavelength of 7.35 cm, where absolutely no source signal was expected."[75] Based on these measurements, Penzias and Wilson had predicted a relatively low source of noise.

However, they still recorded high amounts of background noise even after they had subtracted "all known noise sources at 7.35 cm."[76] To their surprise, they observed that the

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[73] Brian J. Pitts, "Why the Big Bang Singularity Does Not Help the Kalām Cosmological Argument for Theism," *The British Journal for the Philosophy of Science* 59, no. 4 (Dec 2008), quoted in *The Kalām Cosmological Argument, vol. 2 of Scientific Evidence for the Beginning of the Universe*, ed. Paul Copan and William Lane Craig (New York: Bloomsbury Academic, 2018), 81.

[74] Heuvel, 137.

[75] Ibid., 154.

[76] Ibid.

strength of background noise was similar in all directions and "did not vary in the course of the day or night, or in the course of the year."[77] Puzzled and confused, they inspected the telescope in hopes of finding the source of the unknown noise. They discovered a pigeon nest that had been built in the telescope horn. They figured the white droppings the pigeons had left was the source of the noise. Still, even after a thorough cleaning of the telescope, the strange noise remained. Geisler notes that what Penzias and Wilson had discovered was the "afterglow from the Big Bang fireball explosion,"[78] a discovery that earned both of them Nobel Prizes.

Stephen Eales explains that there is a direct connection between the event of the Big Bang and today's life on Earth. He writes: "One of the connections between events 14 billion years ago and everyday life on Earth is something which is in everyone's living room. The pattern of static seen when a TV is tuned to a frequency between channels is mostly caused by sources of terrestrial noise, but about 1% of the static is caused by the radiation discovered by Penzias and Wilson."[79] Remarkably, the strength of this cosmic radiation is similar in every direction, something Penzias and Wilson had predicted. There is a slight change in the strength of the cosmic background microwave radiation from one end of the universe to the other. This change in radiation is the result of a Doppler shift, that according to Eales, is "caused by the motion of the Local Group and by our motion within the Local Group"; he continues, "however, once one allows for this local effect, the statement is true."[80] Therefore, the source of the radiation must be beyond the galaxy.

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[77] Ibid.

[78] Geisler and Turek, *I Don't Have Enough Faith to Be an Atheist,* 78.

[79] Stephen Eales, *Origins: How the Planets, Stars, Galaxies, and the Universe Began* (London: Springer, 2007), 3.

[80] Ibid.

This discovery buried any hopes for a notion of a steady universe (which was popular at the time), and the conclusion of this discovery was that the universe had a beginning out of nothing. However, this "nothingness" from which the universe emerged is not what the atheist astronomer Isaac Asimov claims as "a positive and negative energy."[81] Nothing is totally nothing. Heuvel notes that "apart from Hubble's discovery of the expansion of the universe, the discovery of the cosmic microwave background radiation is arguably the most important cosmological discovery ever made. It constitutes the proof that the universe originated in a hot Big Bang phase."[82]

The result of this fireball explosion is light and heat. The light cannot be observed anymore because its wavelength has been stretched by the expansion of the universe. It was not until twenty years later, after this discovery, that scientists started taking notice of its importance. The agnostic Astronomer, Robert Jastrow, explains:

> No explanation other than the Big Bang has been found for the fireball radiation. The clincher, which has convinced almost the last doubting Thomas, is that the radiation discovered by Penzias and Wilson has exactly the pattern of wavelengths expected for the light and heat produced in a great explosion. Supporters of steady state theory have tried desperately to find an alternative explanation, but they have failed. At the present time, the Big Bang theory has no competitors.[83]

Besides the cosmic microwave background radiation, there is another crucial pillar to the Big Bang: balloons. The link between the Big Bang and balloons is helium, the second most abundant gas in the universe (roughly 20% of the universe). Scientists have calculated that 78% of the known mass in the universe consists of hydrogen, and the remaining 2% is elements such

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[81] Isaac Asimov, *Beginning and End* (New York: Doubleday, 1977), 148.

[82] Heuvel, 139.

[83] Robert Jastrow, *God and the Astronomer* (New York: Norton, 1978), 15.

as carbon, oxygen, nitrogen, etc. Unlike hydrogen, helium is made in stars. Astronomers believe that "it is the primordial stuff out of which the other elements were made.[84] The source of energy in stars is the process of hydrogen converting into helium. However, what is puzzling is that roughly less than 10% of the available helium in the present time could have been produced by nuclear fusion. This means that the remaining 90% would need to have been made in some other way, but it is not known how.

Stephen Eales explains that in the early 1940s, the Russian Physicist, George Gamow, suggested a solution to this paradox. He argued that in the early stages of the Big Bang (in the first few minutes), the universe was extremely hot and dense and that it was practically a nuclear furnace. He further explained that all the available helium seen in the universe today had been formed from hydrogen fusion in the first three minutes of the Big Bang. In addition, he made a startling prediction that was virtually ignored by the scientific community at the time. He argued that "if the density and temperature of the gas were high enough to make helium in the necessary quantities, the gas must have emitted a large amount of radiation—radiation that we should now be able to detect with radio-telescopes."[85] When the cosmic microwave background radiation was discovered by Penzias and Wilson twenty years later, "the observed brightness of the radiation was only about a factor or two away"[86] from Gamow's original prediction.

Galaxy Seeds

The fourth line of evidence for an expanding universe is the great galaxy seeds; these confirmed that slight variations in the temperature of the cosmic background radiation would affirm the Big

[84] Eales, 7.

[85] Ibid.

[86] Ibid., 8.

Bang and a beginning to the universe. In 1989, NASA launched COBE (Cosmic Background Explorer) to measure these temperature variations in space. Three years later, NASA announced a startling discovery: Not only did COBE find the temperature variations as predicted, but it also found that "the explosion and the expansion of the universe was precisely tweaked to cause just enough matter to congregate to allow galaxy formation."[87]

So far, the scientific evidence strongly suggests intelligent design. In fact, the motion of the galaxies today can give clues about their motion in the past. Harvard physicist, Roy Gould, explains: "The first clue to our cosmic origin lies in a mundane question: How are the galaxies moving through space? By knowing how galaxies move today, it might be possible to deduce what they were doing in the past."[88] Gould makes a remarkable suggestion and posits that the expansion of the universe, and the galaxies drifting apart from one another, indicate that "the creation of the universe was not an event that only happened long ago and far away" but that "it is happening now, as you read this."[89] Moreover, this creation was a "fireworks universe as Lemaitre put it, and a Big Bang, as Fred Hoyle termed it in 1949."[90]

The last factor of SURGE is the E that stands for Einstein's general relativity. Most scientists agree that "Einstein's 1917 paper, '*Cosmological Considerations in the General Theory of Relativity'* constituted a key milestone in the 20th century physics."[91] Ross writes that

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[87] Geisler and Turek, *I Don't Have Enough Faith to Be an Atheist,* 79.

[88] Roy R. Gould, *Universe in Creation: A New Understanding of the Big Bang and the Emergence of Life* (Cambridge, MA: Harvard University Press, 2018), 38.

[89] Ibid., 42.

[90] Georges Lemaitre and Fred Hoyle, quoted in Jeremiah Ostriker and Simon Mitton, *Heart of Darkness: Unraveling the Mysteries of the Invisible Universe* (Princeton: Princeton University Press, 2013), 103.

[91] Cormac O'Raifeartaigh, Michael O'Keeffe, Werner Nahm, and Simon Mitton, "Einstein's 1917 Static Model of the Universe: A Centennial Review," *European Physical Journal H* 42, no. 3 (2017): 433.

Einstein's calculations confirmed that space, time, and matter all had a beginning at the moment of the Big Bang and demonstrated that the universe is "simultaneously expanding and decelerating."[92]

All these lines of evidence compiled together present solid evidence for an expanding universe and affirm the second premise of the Kalam cosmological argument. Peter Kreeft adds: "The universe began to exist. Therefore, the universe has a cause for its coming into being, a Creator."[93] Brian Swimme and Tucker Evelyn add that "with our empirical observations expanded by modern science, we are now realizing that our universe is a single immense energy event that began as a tiny speck that has unfolded over time to become galaxies and stars."[94] Therefore, with all things considered, the compilation of evidence leaves no other option but intelligent design.

Although some skeptics such as Christopher Hitchens harshly reject this scientific evidence and maintain that "the observations confirming the Big Bang do not rule out the possibility of a prior universe,"[95] the evidence shows that the universe was caused by a cause that must be outside of space, time, and matter. In other words, the cause of the universe cannot be a part of the known universe. Gerald Schroeder writes: "Whether one accepts all the details or not, the essential hypothesis—that there was some sort of creation—seems from the scientific

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[92] Hugh Ross, *The Creator and the Cosmos* (Revised ed. Colorado Springs: NavPress, 1995), 52.

[93] Peter Kreeft and Ronald Tacelli, *Pocket Handbook of Christian Apologetics* (Westmont, IL: InterVarsity Press, 2009), 59.

[94] Brian Swimme and Mary Evelyn Tucker, *Journey of the Universe* (New Haven: Yale University Press, 2011), 2.

[95] Christopher Hitchens, *The Portable Atheist: Essential Readings for the Nonbeliever* (Philadelphia: Da Capo Press, 2007), 320.

point of view, compelling."[96] This development puts the skeptic about the extra-universal intelligent causal agency into a very precarious position with the following questions he is unable to answer. Even if there were a prior universe, what caused that universe to come into existence? Even if there were a series of prior universes, what caused the existence of that series?

Reductio ad Absurdum of Skeptics' Denial:

Infinite Regress Hypothesis

Before discussing this proposition, it is crucial to shed some light on infinity in order to better understand its nature. Most physicists describe infinity as "that which is unlimited, boundless, or so great that it is impossible for anything to be greater."[97] For example, an infinitely tall tree would be a tree so tall that it would be conceptually impossible for any object in existence to be taller. According to Craig, prior to the works of mathematics giants, such as Bernard Bolzano, Georg Cantor, and Richard Dedekind, the scientific world lacked a clear understanding of an actual infinite. Aristotle did not believe in an actual infinite and argued that "the only legitimate sense in which one can speak of the infinite is in terms of potentiality: something may be infinitely divisible or susceptible to infinite addition, but this type of infinity is potential only and can never be actualized."[98] Potential infinite is a series that arrives closer and closer to infinity but never reaches it. For instance, Karen stands before her class and starts counting one number

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[96] Gerald L. Schroeder, *The Science of God* (New York: Broadway Books, 1997), 22.

[203] Michael Huemer, *Approaching Infinity* (New York: Palgrave Macmillan, 2016), 1, doi:10.1057/9781137560872.

[98] William Lane Craig and James Porter Moreland, eds., *The Blackwell Companion to Natural Theology* (Hoboken, NJ: Wiley-Blackwell, 2009), 104.

per second: “one, two, three, four, five…” on to infinity. Notice that the longer Karen counts, the more numbers she adds to her list and the larger the numbers become, but she will never reach infinity. An actual infinite, on the other hand, is a series that is in fact infinite. These views (that there is no actual infinite) were carried over to the nineteenth century, when skeptics began raising their voices and objecting to the contrary. Bolzano, for example, argued against the prevalent views of the time and insisted that “infinite multitudes can be of different sizes.”[99]

One of the ways scientists show that time had a beginning[100] is by applying philosophical arguments. This argument stems from the premise that it is impossible to have an infinite number of things. Craig explains this in a syllogism:

1. An actual infinite number of things cannot exist.
2. A beginningless series of events in time entails an actually infinite number of things.
3. Therefore, a beginningless series of events in time cannot exist.[101]

To better understand the first premise, it is crucial to understand the meaning of an actual infinite. According to Craig, an actual infinite is not the same as a potential infinite. He writes:

> An actual infinite is a collection of definite and discreet members whose number is greater than any natural number 0,1,2,3… This sort of infinity is used in set theory to designate sets that have an infinite number of members, such as {0, 1, 2, 3…}. The symbol for this kind of infinity is the Hebrew letter aleph: ℵ. By contrast, a potential infinite is a collection that is increasing toward infinity as a limit, but never gets there. The symbol for this kind of infinity is the lemniscate: ∞. Such a collection is really indefinite, not infinite.[102]

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[99] Ibid.

[100] If time had a beginning, that means space and matter had a beginning also. Einstein demonstrated the space-time continuum. That is, space, time, and matter all had a beginning simultaneously. His equation goes like this: $\Delta x2 + \Delta y2 + \Delta z2 + \Delta(ct)2$.

[101] William Lane Craig, *Reasonable Faith: Christian Truth and Apologetics, 3rd ed* (Wheaton, IL: Crossway, 2008), 116.

[102] Ibid., 117.

Mohammad Zarepour agrees with Craig and writes that "by saying that such a collection cannot exist, Craig means that it cannot 'be instantiated in the mind-independent world.'"[103]

Craig further provides another example and explains that it is possible to subdivide any finite distance into infinitely numerous parts. However, it will be impossible to "come up with an actual infinite number of parts."[104] David Hilbert agrees with Craig and explains: "The infinite is nowhere to be found in reality. It neither exists in nature nor provides a legtimate basis for rational thought…the role that remains for the infinite to play is solely that of an idea."[105] Although skeptics object to this kind of reasoning regarding infinity, it is worth noting that postulating an actual infite in the real world leads to what Craig calls "counter-intuitive absurdeties."[106]

If an actual infinite number of things were to exist, the world would be engulfed with all sorts of malarkey. Hilbert's Hotel is such an example: Suppose there is a hotel with a finite amount of rooms that are all occupiued. A new guest arrives looking for a room. The person at the front desk quickly informs the guest that there are no rooms avaiable. Such a scenario occurs daily around the world. Nothing is unsual in this example. However, suppose there is another hotel nearby with an infinite number of occupied rooms. Another guest arrives asking for a room. However, this time the person at the front desk does not dismiss the guest at once, but

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[103] Mohammad Saleh Zarepour, "Infinite Magnitudes, Infinite Multitudes, and the Beginning of the Universe," *Australasian Journal of Philosophy* 99, no. 3 (2021): 472.

[104] Craig, *Reasonable Faith,* 117.

[105] David Hilbert, "On the Infinite," in *Philosophy of Mathematics: Selected Readings*, ed. Paul Bencerraf and Hillary Putnam (Englowood Cliffs, New Jursey: Prentice-Hall, 1964), 141.

[106] Craig, *Reasonable Faith,* 117.

instead, moves the guest in room one into room two; the guest in room two into room three; the guest in room three into room four, and so on.

The result of this clever move is that room one is now vacant even though all the rooms were occupied prior to the guest's arrival. To make matters worse, suppose that an infinite number of new guests arrive at the hotel. This time, the person at the front desk moves the guest in room one into room two, the guest in room two into room four, and the guest in room three into room six,…∞. However, any natural number "multiplied by two always equals an even number."[107] Therefore, all the new infinite number of guests are given "even-numbered rooms."[108] As a result, all the odd numbered rooms are vacant, making it possible to give an infinite number of guests their own rooms even though the rooms were already occupied before the guests arrived. This process is extremely strange, for the person at the front desk can virtually repeat this process of shifting guests from one room to another, forever guaranteeing a room for every new guest, even if all the rooms are already occupied.

The example of Hilbert's Hotel gets even stranger when all the infinite number of guests in the odd-numbered rooms (1, 3, 5, 7,…) leave, thus leaving half the hotel with vacant rooms. To make up for the loss of guests and potential revenue, the person at the front desk moves the guests around in reverse order. Thus, with a skillful maneuver on the part of the clever hotel employee, the hotel always remains occupied and profitable. However, this scenario is far from the truth. Why? Craig explains:

> Suppose that the person in room #4, #5, #6… checked out. At a single stroke the hotel would be virtually emptied, the guest register reduced to but three names, and the infinite converted to finitude. And yet it would remain true that the *same number* of guests checked out this time as when the guests in rooms #1, #3, #5…checked out! In both cases

[107] Craig, *Reasonable Faith,* 118

[108] Ibid.

> we subtracted the *identical number* of guests from the *identical number* of guests and yet did not arrive at an identical result. In fact one can subtract equal quanteties from equal quantities and get any quantity between zero and infinity as the remainder. Can anyone believe that such a hotel could exist in reality?[109]

Hilbert's Hotel is one example that demonstrates the impossibility of the existence of an actual number of infinite things in real life.

There is another philosophical argument that shows time had a beginning. This line of reasoning is hard to refute. The argument is formed in this way:

1. An infinite number of days has no end.
2. But today is the end day of history (history being a collection of all days).
3. Therefore, there were not an infinite number of days before today (i. e., time had a beginning).[110]

To better understand this argument, this graph adopted from Geisler will be provided:

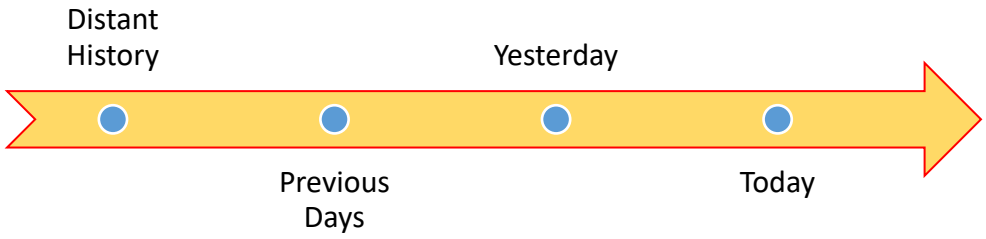

Figure 1:2 [111]

The way this graph demonstrates that time had a beginning is in the following way: Since the timeline of the graph ends on the right (today), and tomorrow has not arrived yet, this shows that time cannot be infinite, for if it were, today would have never arrived. The reason is that an

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[109] Ibid., 119.

[110] Geisler and Turek, *I Don't Have Enough Faith to Be an Atheist,* 86.

[111] Ibid., 87.

infinite cannot have an end—it must extend infinitely. However, the graph clearly shows that today has arrived, thus making time finite. Geisler explains: "You cannot add anything to something that is infinite, but tomorrow we will add another day to our timeline. So our timeline is undeniably finite."[112] In other words, it is impossible to traverse an infinite number of days. Therefore, time must have a beginning. If the days before today were infinite, we would have never known that today is today. However, today is here. Therefore, time cannot be infinite – it must have had a beginning.

Suppose that Brad and his wife leave their home (the starting point) to go on a road trip to the beach (the destination). Brad has been driving all day. His wife is growing impatient and wishes to know how much longer they have. Brad pulls aside, calculates the distance they have already covered, and deducts the remaining distance. He cheerfully informs his wife that they are only fifteen minutes away. However, notice that Brad is only able to make such calculations because there is a fixed point between his starting point and his destination. If the beach were an infinite number of miles away from Brad's home, Brad and his wife would never be able to arrive at the beach, because an infinite number of miles remain. The same analogy can be applied to the universe. Paul Gould explains: "What happens when we apply the reasoning to the history of the universe? If the universe's history is actually infinite, then today would never arrive because an actually infinite number of days would first have to come and go. Yet here we are at today, and so it seems the denial of premise 2 is implausible."[113]

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[112] Ibid.

[113] Paul M. Gould, Travis Dickinson, and R. Keith Loftin, *Stand Firm: Apologetics and the Brilliance of the Gospel* (Nashville: B&H Academic, 2018), 40.

Here is another illustration to demonstrate the impossibility of infinite time. Suppose Jacki just won the Boston Marathon. She goes home to celebrate with her family and friends. Her mother askes her, "how long did it take you to finish the race?" Jacki replies that it took her "three hours and forty-two minutes." The reason it took Jacki that much time to cross the line and win the race is that she had not been running from infinity past. If she had been, she would still be running and would have never arrived at the finish line. However, she did arrive at the finish line and won. Therefore, she began running some time ago, and not infinitely.

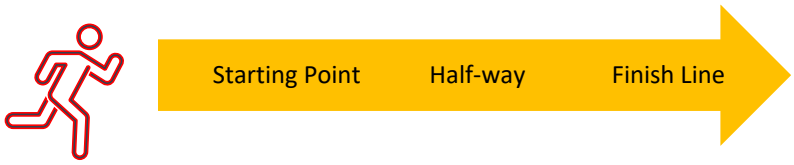

Figure 1:3

The Catholic philosphser Peter Kreeft touches upon this subject and raises a rhetorical question: "Can an infinite task ever be done or completed? If, in order to reach a certain end, infinitely many steps had to precede it, could the end ever be reached?"[114] Kreeft goes on to explain that such a task is impossible to achieve because "an infinite time would be unending, just as the steps."[115]

One might object to this line of reasoning by claiming that it could be possible to reach the step just before the end. However, Kreeft replies that if a task were infinite, there must be an infinite number of steps preceding it. Thus, the step before the end would also be impossible to reach as well as "the step just before *that* one."[116] In fact, none of the steps could be reached,

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[114] Peter Kreeft and Ronald Tacelli, *Pocket Handbook of Christian Apologetics* (Westmont, IL: InterVarsity Press, 2009), 59.

[115] Ibid.

[116] Ibid.

because every step must proceed after an infinite number of steps. Similarly, if the universe were infinite and without a beginning, then it has always existed. This becomes a paradox, says Kreeft, for the following reason:

> If the universe never began, then it always was. If it always was, then it is infinitely old. If it is infinitely old, then an infinite amount of time would have to have elapsed before (say) today. And so infinite number of days must have been completed—one day succeeding another, one bit of time being added to what went before—in order for the present day to arrive. But this exactly parallels the problem of an infinite task. If the present day has been reached, then the actually infinite sequence of history has reached this present point. In fact, has been completed up to this point—for at any present point the whole past must have already happened. But an infinite sequence of steps could never have reached this present point—or any point before it. So, either the present day has not been reached, or the process of reaching it was not infinite. But obviously the present day has been reached. So the process of reaching it was not infinite. In other words, the universe began to exist. Therefore, the universe has a cause for its coming into being, a creator.[117]

Skeptics reject such views and insist that because infinite numbers exist, so can infinite days. However, these skeptics fail to realize that there exists a difference between "an abstract infinite series and a concrete one."[118] The first is merely theoretical and the latter is actual. From the example provided earlier regarding Hilbert's Hotel, it is easy to see why it is impossible to have an actual infinity of things. Geisler explains that mathematically, it is possible to visualize an infinite number of days, but it is impossible to count or live an infinite number of days. In other words, it is possible to conceive of an infinite number of mathematical points between two pencils. However, it is impossible to fit an infinite amount of pencils between them. Numbers can be conceived infinitely because they are abstract, whereas days are concrete.[119]

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[117] Ibid.

[118] Ibid., 88.

[119] This also demonstrates why it is impossible to have an infinite number of Big Bangs in the early history of the universe. The universe is a concrete reality, not abstract. Therefore, it cannot have an infinite series of Big Bangs.

A third and last example is Zeno's paradox proposed by the ancient Greek philosopher, Zeno of Elea. The works of Zeno have been lost to antiquity. However, historians affirm that Zeno wrote a book that contained forty paradoxes. David Darling cites Proclus, who maintains that "four of these, which all concern motion, have had a profound influence on the development of mathematics."[120] Zeno argued that before Achilles crossed the stadium from one end to the other, he first would have to cross the half-way point. However, before he reaches the halfway point, he would have to cross a quarter of the way. Moreover, before he reaches a quarter of the way, Zeno must first pass an eighth of the way into eternity. No matter how hard Achilles tries, he would not be able to ever reach any point. Therefore, "Zeno concluded that motion is impossible."[121] Craig quotes Aristotle's explanation of Zeno's paradox:

> The slower when running will never be overtaken by the quicker; for that which is pursuing must first reach the point from which that which is fleeing started, so that the slower must necessarily always be some distance ahead." Thus, Achilles, however fast he runs, will never catch the plodding Tortoise who started first. And yet, of course, in the real world, faster things do overtake slower ones.[122]

As logical and irrefutable as Zeno's paradox is, it shows the absurdity of applying these principles in real life. It is illogical and absurd to believe that motion is not possible.

These types of arguments, however, have not escaped the fiery criticism of skeptics. For example, some object to the validity of such arguments and insist that infinite sequence is possible, at least in one way. W. David Beck objects: "One wonders why, if there can be infinite

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[120] Proclus, quoted in David Darling, *The Universal Book of Mathematics: From Abracadabra to Zeno's Paradoxes* (Hoboken, NJ: Wiley, 2004), 355.

[121] David Darling, *The Universal Book of Mathematics: From Abracadabra to Zeno's Paradoxes* (Hoboken, NJ: Wiley, 2004), 355.

[122] Aristotle, quoted in William Lane Craig, *Reasonable Faith: Christian Truth and Apologetics*, 3rd ed. (Wheaton, IL: Crossway, 2008), 122.

sequences in mathematics, there could not be one in causality."[123] The answer to this critical question is twofold: First, logical possibilities, or "potential" realities, as Craig calls them, are not to be confused with actual realities. Just because something is conceivable, it does not mean it is actual. A conceivable "thing" is not always believable. Beck argues that "not everything that can be conceived should be believed, otherwise one would be obliged to believe two contradictory propositions just so long as both are conceivable."[124] When deciding between two contradicting propositions, it is more reasonable to rely on the hypothesis "with the greater explanatory power."[125] Second, the mathematical existence of infinite numbers is irrelevant to the existence of logical realities, "for, presumably, the relation between elements in the number series is not causal."[126] Additionally, numbers are abstract, not concrete.

Conclusion

Five lines of scientific evidence and one philosophical argument in this chapter demonstrate the second premise of the Kalam cosmological argument—that the universe had a beginning. The second law of thermodynamics shows that the universe cannot be eternal, because otherwise it would have run out of energy by now. The expansion of the universe is a proof that the universe began its expansion from a finite point of singularity. Hence, it had a beginning. The cosmic background microwave afterglow radiation demonstrates that the Big Bang standard model is true, as predicted. The galaxy seeds and Einstein's theory of general relativity are concrete scientific pieces of evidence that point to a finite universe that has not existed eternally; these

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[123] W. David Beck, "God's Existence" (SOR Faculty Publications and Presentations, 87, 1997), 5, https://digitalcommons.liberty.edu/sor_fac_pubs/87.

[124] Ibid.

[125] Ibid.

[126] Ibid.

factors are accepted by most, if not all, cosmologists today. Moreover, the infinite regress hypothesis demonstrates that an actual infinite series of successive events is neither possible nor logical. Therefore, the universe cannot be infinite. These pieces of evidence can be used in general to defend the biblical doctrine of creation *ex nihilo* against the skeptics' criticism. This evidence can also bolster the faith of believers and reaffirm that the word of God is true regarding the creation event in Genesis 1:1. However, there still exists a controversial topic that has divided Christians worldwide: old earth vs young earth creation (the emergence of the universe out of nothing through the Big Bang vs creation of everything in six days). If the Big Bang model is true, what becomes of Genesis 1 and 2? What is the relationship between the Big Bang and Darwinian Macroevolution? Does the Big Bang entail Macroevolution?

CHAPTER FOUR

THE BIG BANG AND DARWINIAN MACROEVOLUTION

As mentioned in the previous chapter, the greatest obstacle to belief in the Big Bang phenomenon for most Christians is the fear that accepting the Big Bang hypothesis commits them into endorsing Darwinian macroevolution, which, in effect, denies the creation account of Genesis chapters 1 and 2. The question remains whether or not the Big Bang entails Darwinian macroevolution, because if it does, no orthodox Christian qua Bible-believer should accept the Big Bang hypothesis, but does it? This question will be the focus of this chapter.

Big Bang's Entailment of Macroevolution.

The Englishman, Charles Robert Darwin (1809-1882), leads the way in the history of the theory of evolution, even though he was not the first scientist to propose evolution as a scientific fact. Before Charles Darwin, his grandfather, Erasmus Darwin (early 18th century), believed in organic life emerging through naturalism. Later, another thinker, Jean Baptiste de Lamarck, a French evolutionist, argued that "organisms change because characters acquired during an organism's lifetime can be inherited by descendants."[1] However, it was Charles Darwin who popularized the concept of evolution in his 1859 book, *On the Origin of Species,* and presented it as a scientific case. In this book, Darwin did not have much to say regarding the process of evolution. He had personal views, but he never explicitly expressed them. One fact that most people are unaware of is that Darwin did not consider natural selection the sole cause for evolution.[2] Instead, he considered the functional complexity of these organisms to be the most

[1] Michael Ruse, *Can a Darwinian Be a Christian? The Relationship between Science and Religion* (Cambridge: Cambridge University Press, 2012), 12.

[2] Ibid., 23.

fundamental aspect of their existence. Just like the organism, Darwin believed that *Homo sapiens* evolved through the process of natural selection gradually over a long span of time.

Darwin's view of natural selection directly opposed the Genesis account that God created all species and that "every living thing produces life after its own kind" (Gen. 1:24-25). He proposed the theory of microevolution[3] after observing small changes amongst various kinds of finches on the Galapagos Islands. The fourteen different types of finches Darwin studied had similar characteristics but varied according to their beak shapes, their sizes, and the colors of their feathers. Thus, he concluded that the finches had a common ancestor. His observations of these slight differences led him to further postulate that the same process that produced microevolution could explain the origin of all forms of life. Thus, he then proposed the theory of macroevolution, the view that all forms of life originated from a single, common origin.

Most Darwinists today adhere to the view that the universe and everything in it have evolved non-stop since the moment of the Big Bang, 13.8 billion years ago. Even the molecules and the matter humans are made of, according to this belief, come "from the earliest moments of the universe."[4] Approximately 4.6 billion years after the Big Bang, planet earth, the only known planet to host life, was formed, and through complex and sophisticated processes, it took humans "2.4 million years"[5] to evolve from the one-celled organism. The elements essential for life on

[3] Macroevolution (cell to man) is also known as speciation – one species becoming a newer species. Microevolution (or adaptation), on the other hand, is change in species or a population that can be observed over short periods of time.

[4] P. A. Shaver, *Cosmic Heritage: Evolution from the Big Bang to Conscious Life* (New York: Springer, 2011), 1.

[5] Steven J. Theroux, *A Most Improbable Story: The Evolution of the Universe, Life, and Humankind* (Milton, UK: Taylor & Francis Group, 2022), 239.

earth, so they claim, were formed in two phases: (1) in the early minutes of the life of the entire universe, and (2) in the foundations of stars, billions of years later.[6]

The theory continues. In the first phase that only lasted minutes, the universe was only one second old, with a temperature of 10 billion degrees. The immense heat made it possible for stable atoms to form through the process of binding between protons and neutrons. As the universe maintained its rapid expansion, its core temperature cooled down and "nucleosynthesis" was no longer feasible. In the second phase, continues the theory, the heavy elements were made in the stars, a process that lasted for billions of years. P. A. Shaver quotes Fred Hoyle's explanation: "a star is born from its parent molecular cloud when its central temperature and density are sufficient for hydrogen fusion reactions to begin."[7] Subsequently, the inner pressure of the hot protostar pushing outward, and its gravitational force pulling inward create a balance wherein a "virtually constant, sharply-defined bright sphere that is a star"[8] is produced.

Some physicists insist that galaxies were born before the stars, because stars are observed today being formed inside of galaxies from gas and dust. However, Jastrow disagrees and explains that "if galaxies came into being before any stars existed, then each galaxy must initially have been a great, formless cloud of gas, slowly contracting under the inward force of its gravity."[9] However, Shaver insists that no physicist has observed a galaxy condense or shrink. The assumption, therefore, is that galaxies were formed through force; that the birth of stars and

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[6] Shaver, 10.

[7] Fred Hoyle, quoted in P. A. Shaver, *Cosmic Heritage: Evolution from the Big Bang to Conscious Life* (New York: Springer, 2011), 13.

[8] Shaver, 13.

[9] Robert Jastrow and Malcolm H. Thompson, *Astronomy: Fundamentals and Frontiers*. 2nd ed (New York: Wiley, 1974), 225.

galaxies over billions of years provides indisputable evidence for a universe that is expanding and evolving.[10]

Moreover, some scientists today agree that the formation of primitive life on earth was later than 4.6 billion years from the Big Bang during the Hadean Epoch[11] (which occurred at the same time as the formation of the Sun and the solar system). In fact, it is claimed, "evidence suggestive of life has been found in rocks that are 3.8 billion years old, and the earliest probable fossils appear in rocks 3.5 billion years old. Further, some biologists believe that the oldest fossil records that point to life go back to cyanobacteria, an ancient blue green algae.[12] Joseph Seckbach cites Canadian biochemist Radhey Gupta, who argues that for the first two billions years of life on earth, prokaryotic organisms[13] were "the sole inhabitants of our planet."[14] In order for these prokaryotic organisms to inhabit earth, so goes the theory, the environmental conditions necessary for life would have to have been in place.

It is worth pointing out that life cannot exist on stars (too hot) or in empty space (too cold). Therefore, the ideal place would be on a planet that is hospitable to life, such as earth. Alas, Muriel Gargaud writes that "the transition from the non-living to the living remains one of

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[10] Shaver, 17.

[11] The Hadean Epoch, or the Hadean Eon, is the first geological eon on earth. It is a time in earth's history that began roughly 4.5 billion years ago and ended around 3.8 billion years ago. The term was first coined by geologist Preston Cloud in 1972, who used the Greek terminology Hades (Greek for the god of the underworld) to describe the devastating conditions present on earth at that time.

[12] Roy Gould, *Universe in Creation: A New Understanding of the Big Bang and the Emergence of Life* (Cambridge, MA: Harvard University Press, 2018), 151.

[13] Prokaryotic organisms are tiny, single-celled organisms that lack nuclei within the DNA of their cytoplasms. They can survive in extremely harsh conditions. Evolutionists insist that they are the first organisms on the planet to have evolved (even Eukaryotes have evolved from Prokaryotes).

[14] Joseph Seckbach, *Origins Genesis, Evolution, and Diversity of Life* (Boston: Kluwer Academic, 2005), 265.

the main enigmas faced by science."[15] Scientists could not explain the process by which life emerged from non-life. However, with the arrival of Charles Darwin's theory of evolution, evolutionary biologists breathed a sigh of relief and presented various hypotheses that attempt to explain the origin of life on earth. Natural selection, according to Darwin, became the preferred process by which organisms (and the design of these organisms) evolved. In 1859, Darwin argued that the adaptation of organisms to their environments is not convincing evidence of design, but rather, is the process of natural selection acting on random variations.[16] It seems this position assumes that the process of natural selection itself could not have been designed.

As a result, since 1859, Darwin's view has been the dominant position of all evolutionary scientists. As a side note, many people are unaware that initially, Darwin's theory did not explain the origin of the first life on earth. Instead, it attempted to explain "the origin of new forms of life from simpler *preexisting* forms."[17] The common scientific view of that time was that the source of life was the protoplasm (the simple organic and inorganic chemicals that constitute the cell) that could be formed by the chemical reactions of carbon, oxygen, and nitrogen. Ernst Haeckel called it "cell autogeny."[18] T. H. Huxley, known as "Darwin's Bulldog," went a step further and presented a two-step process that, according to him, best explains the origin of the first mother cell. He concluded that if salt can be produced instantly by mixing sodium with chloride, a living cell can also be developed by mere reactions of various chemicals.

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[15] Muriel Gargaud, *Young Sun, Early Earth and the Origins of Life: Lessons for Astrobiology* (Berlin: Springer, 2012), 94.

[16] Stephen Meyer, *Return of the God Hypothesis: Three Scientific Discoveries That Reveal the Mind behind the Universe* (New York: Harper One, 2021), 97.

[17] Ibid., 170.

[18] Ibid.

In 1930, a newer version of this view had been developed by a Russian biochemist, Alexander Oparin. Like his predecessors, Oparin introduced the idea of spontaneous generation[19] and reinforced the possibility of life evolving because of chemical reactions, but with two extra requirements: (1) additional steps of more chemical reactions and (2) time (millions of years).

Another attempt to decipher the mystery of life arrived two decades later, in 1953, when Stanley Miller and Harold Urey used a canteen in the hopes of reinventing the right conditions that lead to the formation of the amino acids which brough forth the first life. Their triumphal achievement of creating life in a lab was short lived because it was later determined that the elements and the chemicals Miller and Urey had used were not a real representation of the early atmospheric conditions. Spontaneous generation remained one of the main enigmas faced by science.[20] Scientists could not explain the process by which life emerged from non-life, especially with the discovery of DNA and its complexity. In the early 1940s, MIT scientist, Claude Shannon, showed that just as the arrangement of specific letters in a language not only demonstrate a high level of mathematical unlikelihood,[21] but also of specificity, so do the arrangements of bases in the DNA show what Francis Crick calls, "specified or functional information."[22]

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[19] Oparin proposed that the primordial soup of organic chemicals was created by the process of sunlight in an anoxic zone, thus causing the first life to appear on earth.

[20] Muriel Gargaud, *Young Sun, Early Earth and the Origins of Life: Lessons for Astrobiology* (Berlin: Springer, 2012), 94.

[21] Claude Shannon, quoted in Stephen C. Meyer, *Return of the God Hypothesis: Three Scientific Discoveries that Reveal the Mind Behind the Universe* (New York: Harper One, 2021), 173.

[22] Francis Crick, quoted in Stephen C. Meyer, *Return of the God Hypothesis: Three Scientific Discoveries That Reveal the Mind behind the Universe* (New York: Harper One, 2021), 173.

Considering the discovery of DNA and its complexity, evolutionary biologists scrambled to find a new and better explanation for life's origin. Not only that, but "finding any evidence of the relics of prebiology in the geological record has been a handicap for all earth-based theories of the origin of life."[23] As a result, in the 1960s, Alexander Graham Cairns-Smith introduced the Clay theory and argued that the process of clay crystals replicating themselves with other biological chemicals gave rise to organic life. In other words, when clay crystallizes, it bonds with other clay and produces even more clay.

Fred Hoyle and Chandra Wickremasinghe proposed the Panspermia theory, or the "seeds everywhere"[24] theory in the early 1980s and suggested that life on earth owes its origin to alien causes, such as comets. They argued that life on earth (seeded from outer space) began to flourish 4.1 billion years ago at the Hadean epoch.[25] An example of this theory, writes Joseph Seckbach, would be the ancient Martian meteorite nicknamed AHL-84001 and sampled from Antarctica, believed by some to "carry a payload of biological traces."[26]

Dawkins agreed with both scientists and added that evolved alien civilizations that traveled from other universes "designed and seeded the first life on earth."[27] Several other theories were proposed afterwards by various scientists in order to explain life's mysterious origin. None, however, remained as popular and as widely accepted as Darwinian

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[23] Janaki Wickremasinghe, Chandra Wickremasinghe, and William Napier, *Comets and the Origin of Life* (Hackensack, NJ: World Scientific, 2010), 186.

[24] Norman L. Geisler and Frank Turek, *I Donn't Have Enough Faith to Be an Atheist* (Wheaton, IL: Crossway, 2004), 115.

[25] Edward J. Steele and N. Chandra Wickremesinghe, eds., *Cosmic Genetic Evolution*, vol. 106 of *Advances in Genetics* (Cambridge, MA: Academic Press, 2020), 2.

[26] Seckbach, 3.

[27] Meyer, 181.

Macroevolution. Today, the scientific consensus is that Darwinism is the best explanation for the origin of all forms of life that eventually, over millions of years, evolved from a first organism.

Shaver presents the ideas of the famous astronomer, Carl Sagan, who created an illustration that explains the emergence of the universe from the Big Bang event, to Darwin's macroevolution, to the current time. Using an imaginary one-year Sagan calendar,[28] the entire timeline of Darwinian macroevolution from the moment of the Big Bang to the present time can be summarized as follows in the next paragraph.

At midnight, the Big Bang took place, ushering in the beginning of a new year. Less than a millionth of a second after midnight, the first cosmic elements were formed. A little over thirteen minutes later, the formation of the cosmic microwave background radiation took place. Within the first two weeks of January, the first stars and galaxies were formed, a process that accelerated until March. Six months later, in September, the solar system and planets were formed. The first traces of life on earth emerged in early September, followed by the formation of the first bacteria days later. It wasn't until November when the first multicellular algae appeared. On December 13, the invertebrates formed, and four days later, the Cambrian explosion brought forth various kinds of new organisms. December 18 marked the appearance of the first vertebrates along with plants and insects three days later. All kinds of reptiles that roamed earth on December 23 went extinct two days later. Life, however, slowly recovered on earth and several new species, such as dinosaurs and mammals, emerged. The darkest day of this new year was December 30 when a massive comet struck earth, killing all the dinosaurs (except for mammals and some other species). Two hours before midnight, December 31, the *Hominoids*

[28] A Sagan Calendar, or Sagan's Cosmic Calendar, is an imaginary method proposed by Carl Sagan that visualizes the events in the universe chronologically in a single year. In other words, it is a hypothetical calendar that compresses the entire history of the universe from its birth at the Big Bang to the current day, all in one year.

walked the earth, and forty minutes before the end of the year, *Homoerectus* migrated out of the African continent. Four minutes into the end of the new year, the Neanderthals lived in Europe. Our ancestors, the modern humans, left Africa two minutes before midnight. The last twenty seconds of the night witnessed the mastering of human agriculture. Less than two tenths of a second before midnight, humans developed radio technology.[29]

Sagan's illustration is widely accepted today by most scientists because they believe everything in the universe can be explained through the lenses of naturalism and materialism. According to Gould, the Big Bang conclusion is backed by many lines of evidence meticulously gathered over the years.[30] Sagan's theory is a long-standing scientific theory that supposedly adequately explains the origin of the universe, while Darwin's theory describes the evolution of life on earth all the way to the present day. It is highly plausible, according to Gould, that the laws of nature caused the first life and other various forms of life to appear on earth because "the universe uses chance events to generate this diversity."[31] Life on earth is, according to Gerhard Borner, "nothing but a product of intricate physical, chemical, and biological processes, an accidental event in the cosmic play."[32] According to this logic, there is no need for a God-type creator, nor is it necessary to consider the books of the Bible, specifically Genesis 1 and 2, reliable. This view is echoed by the co-discoverer of DNA's structure, Francis Crick, who rejects the literal interpretation of the Bible and maintains that fossil records (and their age) demonstrate

[29] Shaver, 135-136.

[30] Gould, 71.

[31] Ibid., 147.

[32] Gerhard Borner, *The Wondrous Universe: Creation without Creator*? (Berlin: Springer, 2011), 150.

that the earth cannot be young. These are all challenges that many scientists level at the idea of earth having been created.

Ross presents the evolutionary biologist John A. Moore's contention that people who believe in science belong in the realm of the rational, inquiring data and logic, whereas people who believe religion belong in the realm of emotional romanticism, focusing on faith and personal preferences.[33] Moreover, the Big Bang surely wipes clean the difficult question of the universe's existence and the origin of life. Questions such as "why is there something rather than nothing?" or "where did everything in the universe come from?" can be reasonably answered by relying on the science behind the Big Bang and quantum physics. Even the mystery of life on earth "is connected with the cosmic evolution."[34]

Considering modern scientific discoveries, Borner argues that the biblical tale of creation should not be understood too literally.[35] In no way, according to this understanding, does the book of Genesis contain scientific literature that explains the universe or the origin of life. It is rather a theological treatise that is based on personal faith about a creator. For example, Genesis 1:21-24 records that God created all species in the air and in the sea by means of specified, purposeful creation. A few verses later, He created human beings from the dust of the earth (Gen 1:27). Moreover, in Genesis 2:7, the instant and direct creation of man from the dust of the ground is repeated.

However, according to this theory, the latest discoveries of hominid fossil records seem to prove the contrary because they show a gradual, slow change from "knuckle walking" apes to

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[33] Hugh Ross, *More Than a Theory: Revealing a Testable Model for Creation* (Grand Rapids, MI: Baker Books, 209), 43.

[34] Borner, 171.

[35] Ibid., 152.

"upright walking" *Homo sapiens,* a direct and apparent contradiction to the creation account. Therefore, because the Genesis 1 and 2 accounts directly contradict the scientific evolutionary process explained in this chapter, it is best not to consider these narratives literally or historically. As far as the meaning of these biblical texts in Genesis, so we are advised, one might consider their poetic style or their theological references to God.

Critics accurately present the Christian Bible's view understanding that God created Adam and Eve on the sixth day of the creation week, and further lists the genealogies and the exact age of Adam's offspring. The Old Testament genealogy is listed from Adam, to Noah, to Abraham, to David. In the New Testament, the genealogy continues from David to Jesus. The Bible also records the age of each male descendant that begat the next offspring. Taking into consideration the historical date of Jesus' birth, "creationists thereby," according to Mills and Sagan, "calculate the heavens and earth were created by God in the year 4004 BC" and that "Earth, therefore, is only 6000 years old by the biblical chronology."[36] To be precise, Jan Sapp writes that it was Archbishop James Ussher (17th century) who dated the origin account to the year 4004 B.C., whereas Georges Comte de Buffon calculated the earth's age to be around 75,000 years old, although plants and animals arose only 37,000 years ago.[37]

Clearly, proponents add, the universe cannot be only a few thousand years young. The Big Bang model has settled this matter. Additionally, the Distant Starlight Dilemma is yet another confirmation for an ancient universe. The distant galaxies, for example, which are supposed to be billions of light years away from the earth, show that the universe must be at least as old as the distance between the earth and the furthest galaxy. The theory holds that, if a certain

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[36] David Mills and Dorion Sagan, *Atheist Universe: The Thinking Person's Answer to Christian Fundamentalism* (Berkeley, CA: Ulysses Press, 2006), 106.

[37] Jan Sapp, *Genesis: The Evolution of Biology* (New York: Oxford University Press, 2003), 4.

galaxy is X light years away from earth, then the universe is X years old because it takes the light, emitted from that galaxy, travelling 186,000 miles per second, X number of years to arrive at earth.

The proponents would argue that, today, this scientific fact is undeniable. Moreover, if the earth were only a few thousand years old, that means Dinosaurs and other giant reptiles cohabitated side-by-side with humans, but according to critics, pre-historic humans and animals never coexisted. Nevertheless, archeological discoveries of Stone Age tools and primitive people supposedly living hundreds of thousands of years ago prove the contrary. The proponents would argue that it is therefore a fact that science has shown Genesis to be a non-literal narrative.

According to critics of Genesis 1 and 2, the latest scientific discoveries in support of the Big Bang and macroevolution are insurmountable. They prove beyond a shadow of a doubt that the universe and the earth are old and evolving. Even some creationists have finally come around and admitted that their views regarding the age of the universe rest on religious beliefs rather than on science. Notably, Raymond E. Grizzle points to Kurt Wise, a Young-Earth creationist[38] who argues that "the earth is young because of biblical statements" and that "scientifically there is not enough evidence to indicate the earth is young."[39] Wise believes that all the cosmological, geological, and archaeological evidence from the past three decades directly point to an old, billions of years old cosmos and earth. Timothy Keller and William Lane Craig agree with Wise and believe that the universe cannot be young, as the Bible indicates. Aware of the theoretical and non-scientific nature of the Darwinian macroevolution, proponents of Darwinian

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[38] Young earth creationists believe that the entire universe and its content was created in less than 10,000 years, according to the biblical accounts of Genesis 1 and 2.

[39] Kurt Wise, quoted in Raymond E. Grizzle, *Science and Religion in Dialogue: Two Histories of Discarded Images* (Lanham, MD: UPA, 2012), 37.

macroevolution take desperate measures including ad hoc redefinition of science to save the theory. They claim that "scientists use the term 'theory' to mean 'explanation.'"[40] Like the Darwinian theory, the atomic theory, the cell theory, and the gravitational theory are all theories which explain their functionalities, yet the existence of atoms, cells, and gravity is undeniable.[41] According to Scott Eugenie, a proposition can be scientific even if it lacks observational criteria. Eugenie rejects the premise that evolution is not science because it was not observed in the past; he explains that it is possible to "study evolution in a laboratory even if no one was present to see zebras and horses emerge from a common ancestor."[42] This idea, however, that there can be a scientific proposition without observation contradicts the scientific method, where observation is a necessary first step.

Although the scientific evidence presented in the first part of this chapter directly contradicts the creation accounts in Genesis 1 and 2, which indicate that the universe is young, there are other explanations that would support the Big Bang model without necessarily entailing Darwinian macroevolution. These explanations are parallel with the Genesis accounts in unity and harmony.

Big Bang's Non-Entailment of Macroevolution.

It is undeniable that the age of the universe is a dividing point between theist and skeptic astronomers.[43] One of the most widely popular views in the Christian world today is that the Big

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[40] Raymond E. Grizzle, *Science and Religion in Dialogue: Two Histories of Discarded Images* (Lanham, MD: UPA, 2012), 85.

[41] Ibid.

[42] Scott C. Eugenie, *Evolution Vs. Creationism: An Introduction,* 2nd ed. (Westport, CT: Greenwood Press, 2009), 14.

[43] Jason Lisle, *Taking Back Astronomy: The Heavens Declare Creation* (Green Forest, AR: Master Books, 2006), 40.

Bang is an atheistic theory that contradicts the Bible. The main objection is that the Big Bang entails macroevolution, and thus, it is incompatible with the creation account of Genesis 1 and 2. Michael Shermer, the director of the Skeptics Society, for instance, attacks the Bible and argues that the beginning verses of Genesis are incorrect. Others, like Dawkins, Harris, and Dennett publicly mock the Bible in their speaking engagements, interviews, and debates.

However, it must be emphasized that the Big Bang is one of the best scientific pieces of evidence that points to God. If analyzed and studied carefully, the Big Bang model best explains the method of the origin of the universe and the need for a supernatural first cause (God) who brought forth the universe into existence out of nothing. In fact, it is the view of this researcher that macroevolution is not only unscientific, but also unbiblical. Species evolving from simpler forms (like single-cell organisms) into complex animals (like lions and tigers) has never been observed. The emergence of life on earth is the product of a powerful, intelligent creator, as Genesis 1 and 2 record. The Big Bang, on the other hand, can be understood as the instantaneous result of God's fiat creation of the universe. Therefore, a case can be made that Big Bang cosmology and biblical cosmogony can coexist and intersect in harmony.

Genesis 1:1 states, "In the beginning God created the heavens and the earth." This simple, yet direct and commanding declaration is where God's plan of creation emerges. The first three words of this passage confirm that the universe is not eternal. The Hebrew word for "created" (*bara*) suggests that the creation process was from absolutely nothing, a process assigned to God and no one else. Thomas McComiskey, an Old Testament scholar, explains that "this distinctive use of the word is especially appropriate to the concept of creation by divine

fiat."[44] He further adds that the verb choice demonstrates the view that something new was created.[45] The word *bara* appears two more times in Scripture (verses 21, 27), and in both times the meaning implies creation out of nothing, or creation of something new. Therefore, Genesis records that the entire universe was created by God, entirely new, out of nothing, a finite time ago. Astrophysicist Hugh Ross explains that this unique doctrine is of immense importance and that it puts biblical revelation in a separate category apart from all other so-called revelatory writings.[46] Ross further explains that the startling scientific evidence for the Big Bang provides exceptional evidence for the trustworthiness of the Genesis account.[47]

Genesis 1:1 gained its scientific support from the five lines of evidence (SURGE) for the beginning of the universe presented in chapter three of this paper. However, the narrative in Genesis 1:2 shifts from cosmic creation of the heavens to emergence of life on earth, a shift that Ross explains is unintentionally ignored by even seasoned biblical scholars.[48] This shift is the well-established "scientific method" utilized by scientists worldwide; it was established by scientists familiar with the Bible. Ross explains:

> I was unaware that . . . the step-by-step process we now know as the scientific method owes its formation to individuals familiar with the Bible. They recognized a pattern in biblical texts that describe a sequence of events. The Genesis account, for example, clearly identifies the frame of reference (or viewpoint) from which the sequence of events is described, including a statement of initial conditions, the chronology, the final conditions, and some conclusions about what transpired. Within the Bible itself we see

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[44] Thomas E. McComiskey, quoted in R. Laird Harris, Gleason L. Archer Jr., and Bruce K. Waltke, *Theological Wordbook of the Old Testament,* vol. 1 (Chicago: Moody Press, 1980), 127.

[45] Ibid.

[46] Hugh Ross, *Navigating Genesis: A Scientist's Journey Through Genesis 1-11* (Covina, CA: RTB Press, 2014), 25.

[47] Ibid.

[48] Ibid.

> instructions to consider contextual elements essential for developing correct interpretations. We also see warnings against the dangers of overlooking them. [49]

Despite Ross's claim that science backs Genesis, the age of the universe remains problematic for Bible believers. Either the Big Bang occurred 14 billion years ago and gave rise to macroevolution, or the universe is only thousands of years old and was created by God. One thing is for sure: both propositions cannot be true since they contradict each other. However, there could be other explanations that would clarify the issue. Ross explains how in the Hebrew language, which contains no more than 3,000 words, the word *yom* (day) has four different literal meanings: 1) *Yom* could mean some daylight hours (for example, 12:00 p. m. - 3:00 p. m.); 2) all daylight hours; 3) a full twenty-four-hour period; 4) a finite but very long period.

According to Ross,[50] the modern Hebrew language has two words to describe long periods of time, ancient biblical Hebrew only has the word *yom* to describe such a period. For instance, Moses would have had no choice but to use the word *yom* to describe the creation history consisting of six epochs.[51] Therefore, it is allegedly possible that *yom*, in this context, means longer periods of time.

However, there are several Young-Earth creationists who reject Ross's conclusions. According to Young-Earth creationists, such as Tim Chaffey and Jason Lisle, the English word "day" and the Hebrew word *yom* can mean a 24-hour period, the daylight portion of the day, or an indefinite period.[52] Proper hermeneutics and accurate contextual interpretation is key when

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[49] Ibid., 25-26.

[50] For the record, Ross is a progressive creationist who believes in Old-Earth creation.

[51] Ross, *Navigating Genesis,* 25-26.

[52] Tim Chaffey and Jason Lisle, *Old-Earth Creationism on Trial: The Verdict Is in* (Green Forest, AR: New Leaf Publishing Group, 2008), 25.

deciding which option *yom* applies to. For instance, one can claim that "back in the day, it took a week to drive across country during the day." It is evident what the word "day" in each case refers to. It is crucial to point out the distinction between ordinal numbers and cardinal numbers. Ordinal numbers are numbers in a numbered sequence, such as first, second, third, etc. Cardinal numbers, on the other hand, are the names given to numbers like one, two, three, etc.[53] Therefore, when the word *yom* is used with the words, "morning" and "evening," the context forces an interpretation of an ordinary day. However, as Lisle explains, "whenever *yom* is used in the Old Testament with either cardinal number or an ordinal number, it always means a literal day."[54] The word *yom* appears in Genesis 1 with a cardinal number and with ordinal numbers (on the second day…on the sixth day).

In addition, *yom* is also pared with "evening" and "morning." Therefore, it is safe to conclude that the word *yom* in Genesis indicates a literal 24-hour day. Terry Mortenson confirms: "When *yôm* is used with a numerical adjective it always restricts the meaning to a literal 24-hour day in the OT."[55] John Whitcomb, Terry Mortenson, and Thane Ury insist that the words of Gerhard Hasel cannot be ignored regarding this subject:

> The author of Genesis 1 could not have produced more comprehensive and all-inclusive ways to express the idea of a literal "day" than the ones that were chosen. There is a complete lack of indicators from prepositions, qualifying expressions, construct phrases, semantic-syn-tactical connections, and so on, on the basis of which the designation "day" in the creation week could be taken to be anything different than a regular 24-hour day. The combinations of the factors of articular usage, singular gender, semantic-syntactical constructions, time boundaries, and so on, corroborated by the divine promulgations in such Pentateuchal passages as Exodus 20:8–11 and Exodus 31:12–17, suggest uniquely

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[53] Ibid., 25-26.

[54] Ibid., 26.

[55] John C. Whitcomb, Terry Mortenson, and Thane H. Ury, *Coming to Grips with Genesis: Biblical Authority and the Age of the Earth* (Green Forest, AR: Master Books, 2008), 194.

> and consistently that the creation "day" is meant to be *literal, sequential*, *and chronological* in nature.[56]

According to Whitcomb, Mortenson, and Ury, this opinion is shared by other scholars, such as John Stek, Gerhard von Rad, Gordon Wenham, Victor Hamilton, and Hermann Gunkel, who all agree on the literal 24-hour interpretation of Genesis.[57]

Now that the issue of the meaning of *yom* has been clarified, the lingering question remains: does the Bible support the Big Bang, and does macroevolution have a place in the creation account of Genesis 1 and 2? Before answering these questions, a crucial point regarding the cause of the Big Bang must first be made. It is worth pointing out that no one knows what happened before the Big Bang. The natural and the physical laws cannot provide an explanation either because these laws had not yet existed. Roy Gould opines: "Although the Big Bang is one of the best scientific pieces of evidence for the origin of the universe, issues such as the origin of matter and energy remain highly problematic."[58] This view was shared by St. Augustine in his *Confessions.* He writes:

> See, I answer to him, who asks: What did God, before he created heaven and earth? I do not give him the answer that somebody once gave jokingly, when he wanted to evade the difficulty of this question: "He prepared hells for those, who are keen enough to investigate these deep mysteries." . . . But I call You, our God, the Creator of the whole Creation . . . Because it is precisely this Time which You have created, and there could pass no times, before You have created Time. If there were no time before heaven and earth, how can anybody ask what you did then? There was no "then," where there was no time.[59]

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[56] Gerhard Hasel, quoted in John C. Whitcomb, Terry Mortenson, and Thane H. Ury, *Coming to Grips with Genesis: Biblical Authority and the Age of the Earth* (Green Forest, AR: Master Books, 2008), 202.

[57] John C. Whitcomb, Terry Mortenson, and Thane H. Ury, *Coming to Grips with Genesis: Biblical Authority and the Age of the Earth* (Green Forest, AR: Master Books, 2008), 203.

[58] Gould, 78.

[59] Saint Augustine of Hippo, *Confessions*: Books 9-13, vol. 27.;2;2.;27, ed. and trans. Carolyn J. Hammond (Cambridge, MA: Harvard University Press, 2016), 209-211.

Since the Big Bang was the beginning of chronological time, one cannot speak of "before" the Big Bang in a chronological way.

Michael Strauss explains that contrary to common belief, the Big Bang is not a random "cosmic collision of gases or a cosmic explosion."[60] It is, rather, a scientific theory that explains the origin of the universe. Everything that exists in the universe came into existence *ex nihilo*, at a point in the finite past. Prior to the Big Bang, nothing of contingent nature existed—no space, no time, no matter. Even the molecular elements that form the known universe and its gases had not yet existed. Therefore, the Big Bang could not be a random collision of atoms and gases because there were no atoms and gases to collide.[61] In other words, the Big Bang was the beginning of everything physical in the universe.

Accordingly, the cause of the universe must be a transcendent, spaceless, timeless, and immaterial one that exists outside of the boundaries of the universe. Who or what, then, is the first cause of the universe? Dawkins calls it the "great unknown," the cause accountable for all existence. On the other hand, the famous physicist Paul Davies acknowledges Dawkins's view and explains that this first cause must be a non-material, non-physical cause. He writes:

> It is hard to resist the impression of something - some influence capable of transcending spacetime and the confinements of relativistic causality - possessing an overview of the entire cosmos at the instant of its creation, and manipulating all the causality disconnected parts to go bang with almost exactly the same vigor at the same time, and yet not so exactly coordinated as to preclude the small scale, slight irregularities that eventually formed the galaxies, and us.[62]

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[60] Michael G. Strauss, *The Creator Revealed: A Physicist Examines the Big Bang and the Bible* (Bloomington, IN: Westbow Press, 2019), 9.

[61] Ibid., 10.

[62] Paul Davies, *The Accidental Universe* (Cambridge: Cambridge University Press, 1982), 126.

Additionally, Andrew Ter Ern Loke writes that being the supreme cause of the universe, the first cause would be the source of the universe's physical laws as well"[63] because only an intelligent mind can understand and explain elegant, complex mathematical and physical models of the universe. Polkinghorne argues: "Science surveys a world whose order makes it appear shot through with signs of mind, and the religious believer can affirm that this is so because it is indeed the Mind of God that is revealed in the works of creation."[64]

This shows that the cause of the universe is not only spaceless and timeless, but also a cause that cannot be made of the material that exists in the universe. Otherwise, the cause would not have existed until the material (or matter) in the universe was first created. A cause that cannot exist within the realm of space and time and cannot be made from matter is hard to describe. The Bible, however, describes God as a Spirit (John 4:24) who is neither material nor physical. Undoubtedly, the transcendent cause of the universe must be a spirit. Whether the universe was created 14 billion years ago or a few thousand years ago, this conclusion that its cause must be transcendent is hard to deny.

In an interview with *Christianity Today*, astronomer Robert Jastrow explains that the view of the universe having a supernatural cause is inescapable. He writes that cosmologists "painted themselves into a corner because they have proven, by their own methods, that the world began abruptly in an act of creation to which you can trace the seeds of every star, every

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[63] Andrew Ter Ern Loke, *God and Ultimate Origins: A Novel Cosmological Argument* (Cham, CH: Palgrave Macmillan, 2017), 177.

[64] John Polkinghorne, "Christianity and Science," in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton and Zachary Simpson (Oxford: Oxford University Press, 2006), 62-64.

planet, every living thing in this cosmos and on the earth."[65] He goes on to say that positing a supernatural force for everything in the universe "is now a scientifically proven fact."[66] Jastrow is correct in his suggestion that a supernatural cause, such as God, might have caused the Big Bang explosion. It is possible that God created the universe *ex nihilo* in an instantaneous expansion.

According to the Big Bang model, the origin of the universe was fiery and explosive. The Bible records that God performed fiat creation of the heavens and the earth (Gen 1:1), but it is silent as to how God performed the creation act. Could God not have used His infinite power and wisdom to create the proper conditions for the Big Bang? The Big Bang started off with finely tuned conditions (also known as the anthropic principle) suitable for the formation of stars and galaxies, and eventual plants and life. The fine tuning of the universe is observable from the moment of the Big Bang until today. Who, apart from God, could have made the initial conditions of the fireball explosion so precise as to create a universe? Ted Peters states, "The Big Bang cries out for a divine explanation. It forces the conclusion that nature had a defined beginning."[67]

Microevolution, or adaptation, is an experiential reality of nature. On a small scale, organisms and species do change and adapt to their environment. The study of various breeds of dogs today can testify to this fact. It is a common understanding among scientists that all kinds of dogs probably descended from a common canine progenitor. This notion aligns well with the

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[65] Bill Durbin, "A Scientist Caught between Two Faiths," *Christianity Today (Pre-1986)*, August 06, 1982, 14, https://go.openathens.net/redirector/liberty.edu?url=https://www-proquest-com.ezproxy.liberty.edu/magazines/scientist-caught-between-two-faiths/docview/200650873/se-2.

[66] Ibid.

[67] Ted Peters, "Francis Collins, the Skeptics, and Evidence for God," *Theology and Science* 14, no. 3 (2016): 225.

biblical doctrine of life producing after its own kind. In other words, microevolution, according to Kenneth Keathley, J. B. Stump, and Joe Aguirre is the process of adaptation within the same species and involves "altered gene frequencies within a population in response to environmental, predatory, and competitive pressure."[68]

Macroevolution (or speciation), on the other hand, has not been scientifically proven; considerable phenotypical changes have neither been observed nor recorded. No one can prove that a single-cell amoeba eventually produced all the species on earth. *Abiogenesis* (the view that life originated from non-life) has neither been observed nor proven. There is no evidence that amphibians evolved from fish, or that birds evolved from land reptiles and eventually, through several other steps of evolutionary mechanisms, gave rise to humans. The biggest obstacle for macroevolution is not explaining the evolution of all life forms from their common ancestor, but rather, explaining the origin of life itself. As Geisler explains, "For unguided, naturalistic macroevolution to be true, the first life must have generated spontaneously from nonliving chemicals."[69]

Genesis 1-11 records the entire history of the universe from the moment of its birth to the appearance of the first life. It is evident from the biblical texts that God created Adam and Eve instantly, "from the dust of the ground" (Gen. 2:7). Adam and Eve did not evolve from a single cell over millions of years, nor did they adapt to their environment as evolutionary theory would suggest. When Darwin observed finches on the Galapagos, he concluded that some finches were more likely to survive and reproduce because of their slightly changed beaks that helped them

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[68] Kenneth Keathley, J. B. Stump, and Joe Aguirre, eds., *Old-Earth or Evolutionary Creation? Discussing Origins with Reasons to Believe and Bio Logos*, BioLogos Books on Science and Christianity (Downers Grove, IL: IVP Academic, 2017), 130.

[69] Geisler and Turek, *I Don't Have Enough Faith to Be an Atheist,* 109.

adapt to their habitat. The finches remained finches even with slightly adapted physical characteristics. The finches did not morph into zebras and elephants. Hence, Adam and Eve did not experience macroevolution—they did not evolve from anything. They were fully grown humans perfectly capable of communicating and understanding God and His commands. Additionally, God created all the animals and plants in the same manner: instantaneously and out of nothing.

If God is all powerful and He wishes to create a lion, for example, He is well capable of creating a fully-grown animal out of nothing. He does not need to utilize millions and billions of years of evolution to eventually change a small organism into the king of the jungle. Macroevolution is the atheist's cosmogonical account; if macroevolution is false, so is atheism. Darwin's natural selection hinges on survival of the fittest; yet somehow through millions of years, the mighty dinosaurs went extinct, but the weak and defenseless sheep survived. This model is also not a scientific model. In fact, it is a contradictory hypothesis that is based on circular reasoning. John F. Ashton cites Walter Veith, a South African zoologist makes the following explanation based on this model, "Less fit organisms are eliminated, and the fitter organisms survive to propagate the species. Organisms thus survive the process because they are fitter, and they are fitter because they survive."[70] Therefore, the entire process of natural selection does not function on the process of addition, but elimination. Hence, for the "*fitter* to survive, there must have been a *less fit* that did not survive."[71]

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[70] Walter Veith, quoted in John F. Ashton, *In Six Days: Why Fifty Scientists Choose to Believe in Creation* (Green Forest, AR: Master Books, 2000), 268-269.

[71] Ibid., 269.

In addition, Ashton adds that "the origin of life could not have occurred by a gradual process but must have been instantaneous."[72] The reason for this is that the functionality of any machine depends solely on the sum of its parts. The total sum of the parts makes the machine work as a whole unit. Take out one part, and the machine either malfunctions or fails entirely. Michael Behe's "irreducible complexity"[73] illustration of a mouse trap best explains this thought. The only way the mouse trap will work is if all its parts are available. Jobe Martin points out that because of the challenge presented by the gradual evolution of one form of species to another, even Darwin doubted this process and acknowledged its difficulty. Martin notes that in 1863, Darwin wrote a letter to a friend where he mentioned his concerns:

> When we descend to details we can prove that no one species has changed; (i.e., we cannot prove that a single species has changed): nor can we prove that the supposed changes are beneficial, which is the groundwork of the theory. Nor can we explain why some species have changed and others have not. The latter case seems to me hardly more difficult to understand precisely and in detail than the former case of supposed change.[74]

Darwin was not alone in his struggle. In 1981, the world's finest evolutionary scientists gathered in Rome in hopes of finding a scientific answer to the puzzle of speciation. At the end of the conference, the conclusion of several of the world's finest leading botanists, paleontologists, biologists, zoologists, geneticists, and cytologists was that no one could explain how one species could transform into another species, or how the process even occurs.[75] Gradual evolution can

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[72] John F. Ashton, *In Six Days: Why Fifty Scientists Choose to Believe in Creation* (Green Forest, AR: Master Books, 2000), 24.

[73] In his 1996 book, *Darwin's Black Box*, Michael Behe writes that irreducible complexity is a complex system wherein if one or any part of the system is removed, the system no longer functions.

[74] Charles Darwin, quoted in Jobe Martin, *The Evolution of a Creationist: A Laymen's Guide to the Conflict between the Bible and Evolutionary Theory*, revised ed. (Rockwall, TX: Biblical Discipleship Publishers, 2004), 61.

[75] Jobe Martin, *The Evolution of a Creationist: A Laymen's Guide to the Conflict between the Bible and Evolutionary Theory*, revised ed. (Rockwall, TX: Biblical Discipleship Publishers, 2004), 62.

neither produce new species nor explain what Martin calls "the origin of unique animals"[76] on earth.

Another reason why macroevolution cannot be a valid theory is the fossil records. The gradual evolution from simple to more complex organisms is absent from the fossil records. Meyer explains that during the Cambrian explosion[77] (supposedly) around 530 million years ago, key groups of animals first appear in the fossil records in a geologically sudden fashion.[78] Moreover, the Cambrian explosion is not an explosion only of new animals, but also new insects, plants, and other groups as well, which appear suddenly in the fossil record with no noticeable correlation to presumed ancestors in the lower and older layers of sedimentary rock.[79] This further discredits the notion that these species gradually evolved from other species.

Meyer adds that these two types of the Cambrian explosion are labeled by the evolutionary biologist Eugene Koonin as "a biological Big Bang."[80] This comes as a direct contradiction to Darwin's evolutionary claim wherein the history of life is depicted as a "gradually unfolding, branching tree, with the trunk representing the first one-celled organisms and the branches representing all the species that evolved from these first forms."[81] In other words, Darwin's model predicted the evolution of organisms and animals from simpler and more basic ancestors. The Cambrian explosion, however, does not support Darwin's predictions. The

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[76] Ibid., 16.

[77] The Cambrian explosion is the sudden appearance of all animal phyla in the geological strata without any trace of prior transitional fossils.

[78] Meyer, 189.

[79] Ibid.

[80] Eugene Koonin, quoted in Stephen C. Meyer, *Return of the God Hypothesis: Three Scientific Discoveries that Reveal the Mind Behind the Universe* (New York: Harper One, 2021), 189.

[81] Ibid., 190.

Cambrian explosion presents a tremendous challenge to Darwin's macroevolutionary theory to such an extent that Darwin himself was troubled because the abrupt appearance of several main groups of animals in the fossil record did not fit into his model of gradual evolutionary change.[82] He wrestled with this challenge, but finally admitted that he had no answer to this puzzle. He writes: "There is another and allied difficulty, which is much graver. I allude to the manner in which numbers of species of the same group, suddenly appear in the lowest known fossiliferous rocks . . . to the question why we do not find records of these vast primordial periods, I can give no satisfactory answer."[83] Although he could not find an immediate answer to this particular puzzle, he did not give up on his theory of macroevolution.

Darwin hoped that one day, the conundrum of the missing fossils would perhaps be solved by new geological discoveries. Ironically, the complete opposite happened as new discoveries contradicted Darwin's pattern of gradual change and "new findings have often shown explosions of novel biological form to have been even more dramatic than Darwin realized."[84] Lastly, it is crucial to note that when Darwin proposed his theory, the scientists of his time calculated the earth to be only 100 million years old. Darwin argued that for his natural selection process to work, it would require longer periods of time for life to be produced. However, as Michael Behe notes, the Cambrian explosion showed that "the window of time for life to go

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[82] Ibid., 191.

[83] Charles Darwin, quoted in Stephen C. Meyer, *Return of the God Hypothesis: Three Scientific Discoveries That Reveal the Mind behind the Universe* (New York: Harper One, 2021), 481.

[84] Meyer, 192.

from simple to complex has shrunk to much less than nineteenth-century estimates of the earth's age."[85]

If the Cambrian explosion shows one thing, it proves that Darwinian macroevolution is not what caused life to emerge on earth. Random chance and necessity are neither scientific explanations nor adequate hypotheses to answer life's most prized question. The diversity of life and the complexity of DNA clearly points to an intelligent cause behind life. If every painting needs a painter, and if every building needs a builder, then it is assured that every program needs a programmer. That is exactly what DNA is—biological software that is unimaginably complex. The cause of it, therefore, must be of immense intelligence.

Lastly, Christians must understand that in the quest for knowledge, the Bible must, without any exceptions, always come first because the Bible is superior to all forms of knowledge, including knowledge gained from the natural laws of the universe.[86] Presupposing the truthfulness of the Bible is essential while conducting science to obtain knowledge. For example, scientists presuppose that the universe is governed by logical, reasonable, immutable sets of laws, and that only intelligent human minds can relate to these laws and the way they function.[87] Science would be "unscientific" without these assumptions and presuppositions. Interestingly, these elements of assumptions and presuppositions are confirmed from the Bible. God is a logical, rational God who upholds the universe and its laws. Because humans are

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[85] Michael J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Free Press, 1996), 32.

[86] Tim Chaffey and Jason Lisle, *Old-Earth Creationism on Trial: The Verdict Is in* (Green Forest, AR: New Leaf Publishing Group, 2008), 107.

[87] Ibid., 108.

created in God's image, therefore, they can use their rational and logical minds to discover and understand the laws of nature.[88]

It is important to remember that although the universe and its natural laws are cursed (Gen. 3; Rom. 8), the Bible is not. Hence, The Bible stands superior to nature and its laws. Second, nature is not the same as scientific theories and hypotheses, because the former is ontological, and the latter epistemological. That is to say, while the former is reality as it is, the latter are mere statements generated by men regarding the natural world. As a result, biblical and scientific "interpretations" can be wrong, but the Bible cannot. Third, interpretations regarding nature hinge mainly on personal beliefs and presuppositions. When a conflict arises between scientific ideas and the Bible, the word of God must always take precedence, especially because humans are fallible, privy to err.[89] For the Bible believer, the word of God must be the standard of truth and authority.

One important distinction must be made regarding science and its definition. The word science comes from the Latin word *scientia*, which means knowledge. However, according to modern day dictionaries, the word science is defined as "knowledge that has been gained through observation and experimentation."[90] Of the three branches of epistemology—empiricist epistemology, rationalist epistemology, and testimonial epistemology, science goes with the first. This leaves out two other valid epistemological methodologies—rationalist and testimonial. This definition is more popular and limiting than the original meaning. For instance, some truths, such as recorded history, fall outside the modern definition of science. The monarchy of Napoleon

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[88] Ibid.

[89] Ibid., 110.

[90] Ibid., 111.

Bonaparte is not knowable through observation and experimentation, but rather, through dependable historical records. Matters of age and history are best dealt with by relying on history rather than the scientific method. If one wishes to know the date America dropped an atomic bomb on Japan, science done in a lab using sophisticated technology will never produce the correct answer because the matter at hand is not a "science" issue, but a history issue. The question of when America dropped an atomic bomb on Nagasaki and Hiroshima can only be answered through historical evidence. This is a common practice by both theists and atheists. However, although historical investigation belongs to testimonial epistemology, when the matter is about the age of the universe (or the earth), historical reliability is often ignored in favor of the scientific method. Lisle adds: "When we ask about the age of something, we are not asking a science question, but rather a history question. We are asking, 'at what point in the past did something come into existence?'"[91] Because there is no access to the past, neither observation nor experimentation can be performed. Thus, the only available tools to get answers are through the historical method. It is true that creationists in general are not at odds regarding operational science (the way in which the universe operates); what separates the two are the elements of naturalism and uniformitarianism.[92] That is why the naturalist who rejects the miraculous is keen to instantly dismiss the supernatural aspect of creation by God, and instead posit naturalistic hypotheses that allegedly explain everything in the universe. However, relying on such *modus operandi* by the naturalist is in fact contradictory. It is illogical to rely on non-natural laws, such as the laws of logic (which are not part of the natural or physical world), to explain nature and its laws. According to the naturalist's view, nature is all that exists. However, the naturalist

[91] Ibid., 113.

[92] Ibid., 118.

repeatedly relies on abstract laws (mainly the law of non-contradiction, to disagree with creationists) to reason through and prove the natural laws, which makes their entire foundation of belief self-refuting. In addition, although the principle of uniformitarianism (the belief that the laws of nature have always been uniform from the beginning) does not change with time, this however does not mean that the same principle applies to the origin of the universe.[93] Secular thinkers assume that the natural laws are the same today as they were in the past. It is true that in most cases, the natural rates have not changed (like earth's orbit around the Sun or the speed at which earth spins on its axis), but Lisle warns that changes in natural rates, or lack thereof, should be considered independently, not collectively; in other words, one should not assume either that all natural rates have changed or that all have not changed. Moreover, Lisle explains that universal events, such as the creation and the flood, most likely changed the rates of several physical processes. Considering the challenges naturalism and uniformitarianism face, the phrase "the present is the key to the past" should be replaced with "the Bible is the key to the present."[94]

Certainly, if one assumes that the formation of earth was achieved through natural means, then it would be logical to posit millions and billions of years to the process. The starting assumptions and the presuppositions of secular thinkers force these conclusions. For example, radio-metric dating, a popular argument used by Old-Earth creationists and even secular thinkers, argues that rocks date back millions and billions of years. However, most people are unaware that radiometric dating is unreliable because it has shown incorrect results for rocks where the age was already known. Several tests were done by geologists where volcanic rocks of known

[93] Ibid., 119.

[94] Ibid., 120.

ages were taken from rocks formed from recent volcanic eruptions.[95] Then, the standard radiometric dating methods were utilized to measure the age of these rocks and the results confirmed that the rocks were millions of years old, when in reality, they were only a few years old.[96] Andrew Snelling lists a few of these examples in the following diagram:

Where?	The Date of the Event	Date by Radio-metric Dating
Mt. Edna Basalt, Sicily	B. C. 122	33,000-170,000 years old
Mt. Edna Basalt, Sicily	A. D. 1972	490,000-210,000 years old
Mt. St. Helens, Washington	A. D. 1980	300,000-400,000 years old
Hualalai Basalt, Hawaii	A. D. 1800-1801	1.76-1.44 million years old

(Table 1:1)[97]

It is clear from the table above that radio-metric dating is not totally accurate with rocks of known age. It is even more difficult to date rocks of an unknown age. Lisle explains that the question should not be whether or not radio-metric dating is reliable, but rather, why it is not.[98] Radio-metric dating is not the only argument skeptics use to attack Young-Earth creationists.

The distant starlight dilemma is a popular argument that has not escaped the darts of skeptics. Distant stars and galaxies are so unimaginably far away that presumably their lights take billions of years to reach earth. However, a solution to this dilemma could be explained through Einstein's "time dilation," a verifiable proposal. According to Einstein, under specific

[95] Lisle explains that the age of the rock dates to its point of crystallization.

[96] Chaffey and Lisle, 132.

[97] Ibid., 132.

[98] Ibid., 133.

conditions, some clocks will tick at a slower rate than under other conditions.[99] In one Young-Earth creation hypothesis, light reaches earth in less than a few thousand years.[100] However, Martin explains that despite the appearance that it took millions of years for light from distant stars to get to earth, God created the universe in a mature state, where the light had already reached earth.[101] In addition, it is crucial to point out that the distant starlight dilemma assumes that the natural laws of the universe were responsible for light arriving on earth. This does not mean, however, that the creation account operates based on the natural laws as well. God did not rely on the laws of the universe when He created everything, but rather, He spoke heavenly objects, animals, and oceans into existence. Therefore, the natural laws of the universe are not satisfactory to describe how God created the universe. This does not mean that the natural laws did not have any part in God's creation process, but rather, that He could have created light and everything else supernaturally in ways that are still unknown to science. Hence, from the perspective of young earth creation, the fact that God used other supernatural means, not understood in today's terms of laws of nature, to deliver the starlight to earth during the creation week is highly probable.[102] To illustrate this point further, Martin makes a good point by explaining that just like God created everything *ex nihilo* in six days, so did Jesus turn six pots of water into wine instantly at the wedding at Cana in a short period of time. Martin reasons: "How is good wine produced? It must be aged. How old was this wine? Only a minute or two. The creator stepped in time and manifested forth His glory. He wanted His disciples to make no

[99] Ibid., 141.

[100] Ibid.

[101] Martin, 30.

[102] Chaffey and Lisle, *Old-Earth Creationism on Trial,* 142.

mistake as to who He is. In doing so, He created something (wine) with the appearance of age."[103] The same is also true with the story of Jesus feeding the five thousand (Mark 6:44). Martin rightly observes that the bread that thousands of people ate that day never went through "a process of mixing ingredients and baking…there was no time."[104]

This proposition of creation with the appearance of old age can apply to the expansion of the universe as well. When the Bible states that God stretches out the heavens (Job 9:8; Isa 40:22), this means that at one point in the finite past, the universe was smaller than its current size—a view supported by modern astronomy. Moreover, Lisle suggests that this also could imply that most of this expansion process was done supernaturally, through means that God does not utilize today.[105]

Before ending this chapter, it is worth restating that man was created and did not evolve. As Martin puts it, "the millions of years idea further detracts from God's omnipotence."[106] During His earthly ministry, Jesus never referred to the earth as being billions of years old. In fact, He confirmed that the earth is young. He even reminded His adversaries of this fact, "But from the beginning of the creation, God made them male and female" (Mk 10:6). Jesus was aware that Adam and Eve were created at some finite point in the past. However, if billions of years had passed prior to Adam and Eve's creation, then Jesus' claim in Mark 10:6 would be false.[107] Similarly, the book of Romans records a similar passage wherein the idea of billions of

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[103] Martin, 32.

[104] Ibid., 33.

[105] Chaffey and Lisle, *Old-Earth Creationism on Trial,* 143.

[106] Martin, 28.

[107] Chaffey and Lisle, *Old-Earth Creationism on Trial,* 28.

years is not supported: “For his invisible attributes, namely, his eternal power and divine nature, have been clearly perceived, ever since the creation of the world, in the things that have been made. So, they are without excuse” (Rom. 1:20). According to Lisle, there is an interesting point that most readers miss in this passage. God’s attributes are understood “ever since the creation of the world.” This means that for God’s attributes to be “seen” and “understood,” human beings had to be first created and present to do the seeing and understanding. The Apostle Paul explains that humans were around from the beginning of the creation process, and thus they were able to personally witness God’s invisible attributes.[108] Lisle adds that Romans 1:20 does not make sense in light of a creation process of billions of years because if humans came on the scene after billions of years from the creation account, then Paul and the Holy Spirit would be inaccurate.[109] The Bible records that in Christ “are hidden all the treasures of wisdom and knowledge” (Col. 2:3). This means that all truth abounds in Jesus Christ. Hence, God’s truth is always the ultimate foundation for all knowledge. The quest for knowledge, therefore, should be founded on the rock of God’s word, not on man’s imperfect opinion.

As this chapter has demonstrated, the Big Bang theory has a coherent relationship with the Genesis accounts. Therefore, Christians need not be afraid of the Big Bang model, for it points directly to a supernatural beginning to the universe. Moreover, this chapter has also demonstrated the fallacy of the view that the Big Bang entails macroevolution. Strong evidence that spontaneous generation is impossible is simply the fact that it has neither been observed nor recorded, aside from it being logically impossible; life cannot and will not emerge from nonlife. Further, the complexity of DNA and the Cambrian explosion clearly point to an intelligent cause

[108] Ibid., 29.

[109] Ibid., 29-30.

for life on earth. It is God who created the universe supernaturally in the beginning (through the Big Bang) and then formed man out of dust (Gen. 1, 2) instantaneously as mature adults. The initial assumption of secular thinkers regarding naturalism and uniformitarianism was also discussed, and several examples were provided to demonstrate the inaccuracy of these views. Finally, the Big Bang as a method God used to create the universe *ex nihilo* and instantaneously is possible and even compatible with the biblical Young-Earth creation model, so long as the miraculous act of creation (without the means of natural laws) is recognized.

CONCLUSION

The purpose of this study was four-fold. The first purpose was to present the thesis – the need to defend the second premise of the Kalam cosmological argument. We began our study by looking at General and Special Revelations, wherein God's creative fingerprints are visible throughout the universe through General Revelation. The second purpose was to examine the arguments presented by skeptics, such as the eternality of the universe, the plurality of the universe, the necessity of the universe, and the aseity of the universe; these alternate models were examined in detail, taking into consideration their historical roots and eventual morphism into newer models. The third purpose of this study was to reject the skeptic's rejections and defend the second premise of the Kalam cosmological argument; this was achieved by presenting five lines of scientific evidence and one line of philosophical evidence that together provide a powerful refutation to the skeptic's theories. The fourth and last purpose of this study was to present the Big Bang theory and its relationship with the biblical account of creation, wherein God miraculously brought forth the entire universe into existence *ex nihilo*, thus eliminating the Old-Earth view held to this day by skeptics and some Christians. Moreover, the Big Bang's non-entailment of macroevolution was discussed and analyzed with several pieces of evidence, such as carbon radiometric dating, Behe's Irreducible Complexity, and the Cambrian explosion; these pieces of evidence were utilized to demonstrated that earth is not and cannot be billions of years old.

After this four-fold purpose had been accomplished, we finally concluded that this paper had successfully developed the thesis that the second premise of the Kalam cosmological argument is defendable. In our view, the available scientific and philosophical evidence clearly demonstrates that an enormously vast, complex universe governed by immutable, intrinsic

physical and natural laws could not have arisen out of nothing without a cause. Even if the sudden emergence of the universe out of nothing could somehow be explained by Hawking's quantum mechanical laws, the existence of these laws cannot be explained naturally. Even the laws of nature, Einstein's general relativity law ($E=mc^2$), Kepler's planetary motion law, Newton's universal gravitational law ($F=G\ m_1\ m_2\ /d^2$), and the laws of logic cannot be explained using mathematics or physics. Leonard Mlodinow, co-author of Hawking's *Grand Design*, admits that such physical and mathematical laws cannot explain the origin of these abstract values. Therefore, if Hawking, Krauss, DeGrasse Tyson, and others wished to make the claim that the laws of gravity or other forces can create the universe out of nothing and without a cause, they must also be willing and able to explain the origin, the need, and the purpose for such laws. Moreover, laws do not possess causal properties because laws merely explain the relationship between cause and effect but are not themselves the cause. Hawking's law of quantum gravity cannot create the universe because gravity did not exist prior to the universe coming into existence. How, then, did gravity create a universe out of nothing, when gravity had not yet existed? In other words, how can something that does not exist do anything?

Pace Hawking, gravity cannot create a universe, but God can.

BIBLIOGRAPHY

"Books"

Ariona, Rubén and Savvas Nesseris. *What Can Machine Learning Tell Us about the Background Expansion of the Universe?* Ithaca, NY: Cornell University Library, 2020. doi:10.1103/PhysRevD.101.123525.

Ashton, F. John. *In Six Days: Why Fifty Scientists Choose to Believe in Creation*. Green Forest, AR: Master Books, 2000.

Asimov, Isaac. *Beginning and End.* New York: Doubleday, 1977.

Barrow, John D., Paul C. W. Davies, and Charles L. Harper Jr., eds. *Science and Ultimate Reality: Quantum Theory, Cosmology, and Complexity.* Cambridge: Cambridge University Press, 2004.

Behe, Michael J. *Darwin's Black Box: The Biochemical Challenge to Evolution*. New York: Free Press, 1996.

Borner, Gerhard. *The Wondrous Universe: Creation without Creator*? Berlin: Springer, 2011.

Carr, Bernard, ed. *Universe or Multiverse?* Cambridge: Cambridge University Press, 2014.

Chaffey, Tim, and Jason Lisle. *Old-Earth Creationism on Trial: The Verdict Is in.* Green Forest, AR: New Leaf Publishing Group, 2008.

Collins, Francis S. *The Language of God: A Scientist Presents Evidence for Belief.* Waterville, ME: Wheeler Pub, 2007.

Copan, Paul, and William Lane Craig. *The Kalam Cosmological Argument*. London: Bloomsbury Academic, 1983.

Darling, David J. *The Universal Book of Mathematics: From Abracadabra to Zeno's Paradoxes.* Hoboken, NJ: Wiley, 2004.

Davies, Paul. *God and the New Physics.* New York: Simon and Schuster, 1983.

Davies, Paul. *The Accidental Universe.* Cambridge: Cambridge University Press, 1982.

Davies, Paul. *The Cosmic Blueprint.* New York: Simon & Shuster, 1988.

Davies, Paul. *What's Eating the Universe? And Other Cosmic Questions.* Chicago: University of Chicago Press, 2021.

DeGrasse Tyson, Neil, and Donald Goldsmith. *Origins: Fourteen Billion Years of Cosmic Evolution*. New York: W. W. Norton & Company, 2004.

Eales, Stephen. *Origins: How the Planets, Stars, Galaxies, and the Universe Began.* London: Springer, 2007.

Eddington, Sir Arthur. *The Expanding Universe.* Cambridge: Cambridge University Press, 1987.

Erasmus, Jacobs. *The Kalām Cosmological Argument: A Reassessment*. Vol. 25 of Sophia Studies in Cross-cultural Philosophy of Traditions and Cultures. Cham, CH: Springer, 2018.

Friedreich, Simon. *Multiverse Theories: A Philosophical Perspective.* Cambridge: Cambridge University Press, 2021.

Gargaud, Muriel, Hervé Martin, Purificación López-García, Thierry Montmerle, and Robert Pascal. *Young Sun, Early Earth and the Origins of Life: Lessons for Astrobiology*. Translated by Storm Dunlop. Berlin: Springer, 2012.

Geisler, Norman L., and Frank Turek. *I Don't Have Enough Faith to Be an Atheist.* Wheaton, IL: Crossway, 2004.

Gould, Paul, Travis Dickinson, and R. Keith Loftin. *Stand Firm: Apologetics and the Brilliance of the Gospel.* Nashville: B&H Academic, 2018.

Gould, Roy. *Universe in Creation: A New Understanding of the Big Bang and the Emergence of Life.* Cambridge, MA: Harvard University Press, 2018.

Grizzle, Raymond E. *Science and Religion in Dialogue: Two Histories of Discarded Images*. Lanham, MD: UPA, 2012.

Hawking, Stephen. *A Brief History of Time.* New York: Bantam, 1988.

Hawking, Stephen, and Leonard Mlodinow. *The Grand Design.* New York: Bantam Books, 2010.

Hawking, Stephen, and Roger Penrose. *The Nature of Space and Time*. 13th print ed. Princeton, NJ: Princeton University Press, 2010.

Heuvel, Edward van den. *The Amazing Unity of the Universe: And Its Origin in the Big Bang*. 2nd ed. Cham, CH: Springer, 2016.

Hitchens, Christopher. *The Portable Atheist: Essential Readings for the Nonbeliever.* Philadelphia: Da Capo Press, 2007.

Huemer, Michael. *Approaching Infinity.* New York: Palgrave Macmillan, 2016. doi:10.1057/9781137560872.

Jastrow, Robert. *God and the Astronomer.* New York: Norton, 1978.

Jastrow, Robert, and Malcolm H. Thompson. *Astronomy: Fundamentals and Frontiers*. 2nd ed. New York: Wiley, 1974.

Keathley, Kenneth, J. B. Stump, and Joe Aguirre, eds. *Old-Earth or Evolutionary Creation? Discussing Origins with Reasons to Believe and Bio Logos*. BioLogos Books on Science and Christianity. Downers Grove, IL: IVP Academic, 2017.

Koestler, Arthur. *Darkness at Noon*. Translated by Daphne Hardy. New York: Bantam, 1941.

Kragh, Helge and Malcolm S. Longair, eds. *The Oxford Handbook of the History of Modern Cosmology*. Oxford: Oxford University Press, 2019.

Krauss, Maxwell Lawrence. *A Universe from Nothing: Why There Is Something Rather Than Nothing*. New York: Atria Paperback, 2013.

Kreeft, Peter, and Ronald Tacelli. *Pocket Handbook of Christian Apologetics*. Westmont, IL: InterVarsity Press, 2009.

Lane Craig, William. *On Guard: Defending Your Faith with Reason and Precision*. Colorado Springs, CO: David C. Cook, 2010.

Lane Craig, William. *Reasonable Faith: Christian Truth and Apologetics*. 3rd ed. Wheaton, IL: Crossway, 2008.

Lane Craig, William, and James Porter Moreland, eds. *The Blackwell Companion to Natural Theology*. Hoboken, NJ: Wiley-Blackwell, 2009.

Lemaître, Georges. *Learning the Physics of Einstein with Georges Lemaître before the Big Bang Theory*. Edited by Jan Govaerts and Jean-François Stoffel. Cham, CH: Springer, 2019.

Lennox, John C. *God and Stephen Hawking: Whose Design Is It Anyway?* Oxford: Lion, 2010.

Lisle, Jason. *Taking Back Astronomy: The Heavens Declare Creation*. Green Forest, AR: Master Books, 2006.

Martin, Jobe. *The Evolution of a Creationist: A Laymen's Guide to the Conflict between the Bible and Evolutionary Theory*. Revised ed. Rockwall, TX: Biblical Discipleship Publishers, 2004.

McComiskey, Thomas E. Quoted in R. Laird Harris, Gleason L. Archer Jr., and Bruce K. Waltke, *Theological Wordbook of the Old Testament,* vol. 1. Chicago: Moody Press, 1980.

Meyer, Stephen. *Return of the God Hypothesis: Three Scientific Discoveries That Reveal the Mind behind the Universe.* New York: Harper One, 2021.

Mills, David, and Dorion Sagan. *Atheist Universe: The Thinking Person's Answer to Christian Fundamentalism.* Berkeley, CA: Ulysses Press, 2006.

Moody, Todd. *Does God Exist? A Dialogue for God's Existence*. Indianapolis: Hackett Publishing, 2013.

Nomura, Yasunori, Bill Poirier, John Terning, and Farzad Nekoogar. *Quantum Physics, Mini Black Holes, and the Multiverse: Debunking Common Misconceptions in Theoretical Physics*. Cham, CH: Springer, 2018.

Ostriker, Jeremiah, and Simon Mitton. *Heart of Darkness: Unraveling the Mysteries of the Invisible Universe*. Princeton, NJ: Princeton University Press, 2013.

Padgett, Alan. *Science and the Study of God*. Grand Rapids, MI: Eerdmans, 2003.

Pruss, Alexander, and Joshua L. Rasmussen. *Necessary Existence.* Oxford: Oxford University Press, 2018.

Robson, John. *Origin and Evolution of the Universe: Evidence for Design?* Montreal: McGill-Queen's University Press, 1987.

Ross, Hugh. *More Than a Theory: Revealing a Testable Model for Creation.* Grand Rapids, MI: Baker Books, 2009.

Ross, Hugh. *Navigating Genesis: A Scientist's Journey Through Genesis 1-11*. Covina, CA: RTB Press, 2014.

Ross, Hugh. *The Creator and the Cosmos*. Revised ed. Colorado Springs: NavPress, 1995.

Ross, Hugh. *Why the Universe Is the Way It Is.* Grand Rapids, MI: Gardners Books, 2008.

Rundle, Bede. *Why There Is Something Rather Than Nothing.* New York: Clarendon Press, 2004.

Ruse, Michael. *Can a Darwinian Be a Christian? The Relationship between Science and Religion*. Cambridge: Cambridge University Press, 2012.

Saint Augustine of Hippo. *Confessions*: Books 9-13. Vol. 27.;2;2.;27. Edited and translated by Carolyn J. Hammond. Cambridge, MA: Harvard University Press, 2016.

Sapp, Jan. *Genesis: The Evolution of Biology*. New York: Oxford University Press, 2003.

Schroeder, Gerald L. *Genesis and the Big Bang*. New York: Bantam Books, 1992.

Schroeder, Gerald L. *The Science of God*. New York: Broadway Books, 1997.

Scott, Eugenie C. *Evolution vs. Creationism: An Introduction*. 2nd ed. Westport, CT: Greenwood Press, 2009.

Seargent, David. *Weird Astronomical Theories of the Solar System and beyond.* Cham: Springer, 2016.

Seckbach, Joseph. *Origins Genesis, Evolution, and Diversity of Life*. Boston: Kluwer Academic, 2005.

Shaver, P. A. *Cosmic Heritage: Evolution from the Big Bang to Conscious Life*. New York: Springer, 2011.

Silk, Joseph. *The Infinite Cosmos Questions from the Frontiers of Cosmology*. Oxford: Oxford University Press, 2006.

Sober, Elliott. *Ockham's Razors: A User's Manual.* Cambridge: Cambridge University Press, 2015.

Sproul, R. C., and Keith Mathison. *Not a Chance: God, Science, and the Revolt against Reason*. Grand Rapids, MI: Baker Books, 2014.

Strauss, Michael G. *The Creator Revealed: A Physicist Examines the Big Bang and the Bible*. Bloomington, IN: Westbow Press, 2019.

Stump, J. B., and Alan G. Padgett. *The Blackwell Companion to Science and Christianity*. Malden, MA: Wiley-Blackwell, 2012.

Swimme, Brian, and Mary Evelyn Tucker. *Journey of the Universe*. New Haven: Yale University Press, 2011.

Ter Ern Loke, Andrew. *God and Ultimate Origins: A Novel Cosmological Argument*. Cham, CH: Palgrave Macmillan, 2017.

Theroux, Steven. *A Most Improbable Story: The Evolution of the Universe, Life, and Humankind*. Milton, UK: Taylor & Francis Group, 2022.

Voller, Ronald. *Hubble, Humason and the Big Bang: The Race to Uncover the Expanding Universe*. Chichester, UK: Praxis Publishing, 2021.

Whitcomb, John C., Terry Mortenson, and Thane H. Ury. *Coming to Grips with Genesis: Biblical Authority and the Age of the Earth*. Green Forest, AR: Master Books, 2008.

Wickramasinghe, Janaki, Chandra Wickramasinghe, and William Napier. *Comets and the Origin of Life*. Hackensack, NJ: World Scientific, 2010.

Woolfson, Michael. *Time, Space, Stars and Man: The Story of the Big Bang*. Singapore: World Scientific Publishing Company, 2009.

"Articles"

Beck, W. David. "God's Existence." In *In Defense of Miracles*, eds. Douglas Geivett and Gary R. Habermas, 149-162, 296-299. Downers Grove, IL: InterVarsity Press, 1997.

Berryman, Sylvia. "Democritus." In *Stanford Encyclopedia of Philosophy*. Edited by Edward N. Zalta. Winter 2016 edition. https://plato.stanford.edu/archives/win2016/entries/democritus.

DeGrasse Tyson, Neil. "In the Beginning." *Natural History Magazine*, September 2003. Accessed August 27, 2022. https://www.haydenplanetarium.org/tyson/essays/2003-09-in-the-beginning.php.

Durbin, Bill. "A Scientist Caught between Two Faiths." *Christianity Today (Pre-1986)*, August 6, 1982. July 10, 2022. https://go.openathens.net/redirector/liberty.edu?url=https://www-proquest-com.ezproxy.liberty.edu/magazines/scientist-caught-between-two-faiths/docview/200650873/se-2.

EvidentOne9Teen. "Does No Boundary Mean No Creator? Stephen Hawking Vs William Lane Craig." YouTube video, 25:16. August 24, 2019. https://www.youtube.com/watch?v=SccjUqVyQYM.

George, Michael. "Michio Kaku's Religion of Physics." *World Futures Review* 3, no. 3 (2011): 17-24.

Hardy, Bryce E. "Is God the Necessary Being?" *Quaerens Deum: The Liberty Undergraduate Journal for Philosophy of Religion* 3, no. 1 (2017).

Hilbert, David. "On the Infinite." In *Philosophy of Mathematics: Selected Readings*, ed. Paul Bencerraf and Hillary Putnam. Englowood Cliffs, NJ: Prentice-Hall, 1964.

Linde, Andrei. "A Brief History of the Multiverse." *Reports on Progress in Physics* 80, no. 2 (January 2017). https://doi.org/https://doi.org/10.48550/arXiv.1512.01203.

O'Raifeartaigh, Cormac, Michael O'Keeffe, Werner Nahm, and Simon Mitton. "Einstein's 1917 Static Model of the Universe: A Centennial Review." *European Physical Journal H* 42, no. 3 (2017): 431-474.

Park, John J. “The Kalām Cosmological Argument, the Big Bang, and Atheism.” *Acta Analytica* 31, no. 3 (2016): 323-335.

Peters, Ted. “Francis Collins, the Skeptics, and Evidence for God.” *Theology and Science* 14, no. 3 (2016): 223-229.

Pitts, Brian J. “Why the Big Bang Singularity Does Not Help the Kalām Cosmological Argument for Theism.” *The British Journal for the Philosophy of Science* 59, no. 4 (December 2008). Quoted in *The Kalām Cosmological Argument, vol. 2 of Scientific Evidence for the Beginning of the Universe*, ed. Paul Copan and William Lane Craig. New York: Bloomsbury Academic, 2018.

Polkinghorne, John. “Christianity and Science.” In *The Oxford Handbook of Religion and Science*. Edited by Philip Clayton and Zachary Simpson. Oxford: Oxford University Press, 2006.

Van Den Berg, Hugo. “Occam’s Razor: From Ockham’s via Moderna to Modern Data Science.” *Science Progress* 101, no. 3 (2018): 261-272.

Wheeler, John A. “Beyond the Hole.” In *Some Strangeness in the Proportion*, ed. Harry Wolf. Reading, MA: Addison-Wesley, 1980.

Zarepour, Mohammad Saleh. “Infinite Magnitudes, Infinite Multitudes, and the Beginning of the Universe.” *Australasian Journal of Philosophy* 99, no. 3 (2021): 472-489.