

# JBTS

VOLUME 2 | ISSUE 2

## JOURNAL OF BIBLICAL AND THEOLOGICAL STUDIES

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# ***Journal of Biblical and Theological Studies***

*JBTS is published twice a year online at [www.jbtsonline.org](http://www.jbtsonline.org) and in print through  
Pickwick Publications, an Imprint of Wipf and Stock Publishers  
199 West 8th Avenue, Suite 3, Eugene, OR 97401, USA*

Print ISSN 2572-2832

Online ISSN 2572-2859

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The *Journal of Biblical and Theological Studies (JBTS)* is an academic journal focused on the fields of Bible and Theology from an inter-denominational point of view. The journal is comprised of an editorial board of scholars that represent several academic institutions throughout the world. JBTS is concerned with presenting high level original scholarship in an approachable way.

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## ***Why Studying Philosophy of Science Matters: An Editorial Invitation and Introduction***

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Ryan teaches full-time at Grand Canyon University and is a Managing Editor of JBTS

This special issue of the *Journal of Biblical and Theological Studies* features articles exploring contentious but important topics within the philosophy of science. It represents views from across the spectrum of evangelicalism. In keeping with the mission of *JBTS*—to relay content that is original and yet accessible—this issue will contain not only a diverse range of viewpoints but also unique writing styles that are addressed to different audiences; accordingly, some articles are more philosophically heavy and scholarly and others more approachable and readable. In sum, the issue offers a set of distinct contributions from varied backgrounds and positions, which make this issue a useful overview for students and an impetus for serious scholarly reflection.

With an intent to address students and laymen and yet not exclude scholars, this editorial introduction will introduce the reader to three things. First, it will briefly explain the nature of philosophy of science. Second, it will address why philosophy of science is a subject worth studying, particularly for those in the biblical and theological fields. Third, it will provide an abbreviated introduction to the articles in this special issue.

### **Philosophy of Science: An Introduction**

While the subject of philosophy of science might sound intimidating or irrelevant, the questions that it asks confront Christians on a regular basis. How does the world function? Does it always behave according to regular principles or not? What is science? Does science provide objective knowledge about the world? How much of the contemporary “scientific consensus” is valid? What is the relationship of theology to science? Is the earth relatively young or old? How did God create the world? Is evolutionary creation or theistic evolution a viable option for the Christian? What is God’s relationship to science and our contemporary scientific theories? These questions might be condensed into a broader one: What is God’s relationship to the world?

In other words, philosophy of science is a subcategory of philosophy which studies the metaphysical foundations and methods of science, yet it also raises

questions about everyday life. One philosopher of science, Brendan Sweetman, provides an excellent summary of the main issues:

The philosophy of science . . . raises foundational questions with regard to such issues as the definition of science and its method of inquiry, the truth status of scientific theories, whether science gives us objective knowledge of the real world, the difference between science and nonscience, the limits of science, and its relationship to other forms of inquiry, such as philosophy, theology, religion, and ethics.<sup>1</sup>

Philosophy of science analyses and assesses foundational issues related to the study of science. It thus often asks questions and seek answers that scientists (usually untrained in philosophy of science) take for granted.

Consequently, the intersection of science and philosophy of science has often been a precarious one. Since several of the articles in this special issue explore this intersection on a more scholarly level,<sup>2</sup> I will limit myself to the popular level. For example, Bill Nye has recently disregarded the importance of the philosophy of science,<sup>3</sup> though he has apparently changed his mind on this matter.<sup>4</sup> Moreover, Neil deGrasse Tyson has consistently disparaged the value of philosophy.<sup>5</sup> Even more troubling, the popular but prestigious Cambridge Astrophysicist, Stephen Hawking, has argued: “Philosophy is dead. Philosophy has not kept up with modern developments in science, particularly physics. Scientists have become the bearers of the torch of discovery in our quest for knowledge.”<sup>6</sup> In other words, Hawking (along with Nye and Tyson) claims that scientific knowledge is the only knowledge, an approach often called scientism. It is worth noting that these men are not philosophers—for, indeed,

1. Brendan Sweetman, “The Philosophy of Science,” in *Dictionary of Christianity and Science: The Definitive Reference for the Intersection of Christian Faith and Contemporary Science*, ed. Paul Copan, Tremper Longman III, Christopher L. Reese, and Michael G. Strauss (Grand Rapids, MI: Zondervan, 2017), 511. I would highly recommend this volume to the person interested in the intersection of the Christian faith and science. In fact, a couple of contributors of this special issue also contributed to this volume, including Bruce L. Gordon and J. B. Stump. Other helpful and accessible introductory texts for students are Alister E. McGrath, *Science & Religion: A New Introduction*, 2nd ed. (Oxford: Wiley-Blackwell, 2010); and J. B. Stump, *Science and Christianity: An Introduction to the Issues* (Oxford: Wiley-Blackwell, 2016).

2. See especially R. Clinton Ohlers’s section on the “conflict thesis.” See also the contribution by Joshua M. Moritz.

3. Bill Nye, “Hey Bill Nye, ‘Does Science Have All the Answers or Should We Do Philosophy Too?’” in “Tuesdays with Bill,” on Youtube, last modified February 23, 2016, accessed May 17, 2017, [https://www.youtube.com/watch?v=ROe28Ma\\_tYM](https://www.youtube.com/watch?v=ROe28Ma_tYM).

4. See Olivia Goldhill, “Justified True Belief: Bill Nye, the Science Guy, says I convinced him that philosophy is not just a load of self-indulgent crap,” in *Quartz*, last modified April 15, 2017, accessed May 17, 2017, <https://qz.com/960303/bill-nye-on-philosophy-the-science-guy-says-he-has-changed-his-mind>.

5. Neil deGrasse Tyson, “Neil deGrasse Tyson Returns Again,” in Episode 489, on Nerdist Podcast, last modified March 7, 2014, accessed May 17, 2017 (the comments about philosophy begin at 20:20), <http://nerdist.com/nerdist-podcast-neil-degrasse-tyson-returns-again>.

6. Stephen Hawking and Leonard Mlodinow, *The Grand Design* (New York: Bantam, 2010), 1-2.

if they were philosophers they would have recognized that the claim they are making is a philosophical one and not a scientific one. Stephen Hawking's claims in particular have been strongly critiqued.<sup>7</sup> More important for our purposes is the impression in the background of this discussion: while science is acknowledged to give answers, even most of the answers of life, philosophy (and philosophy of science) is often neglected in the meantime, at least on the popular level.

## **Why Philosophy of Science Matters: A Theological Introduction**

These discussions lead us to the following questions: Why is philosophy of science a subject worth considering? Why does philosophy of science matter for the rest of us? If you are a philosopher, this question needs no answer. But if you are a lay individual or a professional in the biblical and theological fields, it might. While more could be said, I will give five reasons why we should study the philosophy of science. These reasons will serve as an introduction to this special issue: the philosophy of science helps to explicate our committed but subconscious assumptions, to imagine our story, to uncover knowledge of God, to gaze upon God in a beautiful and sanctifying encounter, and to avoid becoming reductionistic in our thinking of the God-world relation.<sup>8</sup> These five reasons will also conveniently serve as a foretaste of the articles in this special issue.

### **1. The Philosophy of Science Helps to Explicate our Committed but Subconscious Assumptions**

Philosophy is “just thinking hard” about something, as the recent Templeton prize winner, Alvin Plantinga aptly quipped.<sup>9</sup> While there are more precise ways to define philosophy, at its heart philosophy seeks to think well about existence, knowledge, and morality, among other things. Philosophy of science, therefore, is “hard thinking” about the meaning, nature, and extent of science. It thus undergirds much of our thinking about the created world. We all necessarily ask (whether explicitly or not), questions like: What is reality? From where did it come? How do I know? Is this world real or illusory? Can my senses uncover it? Of course, scientism (e.g., Stephen Hawking) might assume answers to all of these questions—“certainly,” one might quip, “reality is tangible physicality, so the world is real, and my senses help me

7. As two examples, see John Polkinghorne, *Science and Religion in Quest of Truth* (New Haven: Yale University Press, 2011); and Wolfgang Smith, *Science & Myth: With a Response to Stephen Hawking's The Grand Design* (Tacoma, WA: Angelico, 2012).

8. For another approachable analysis, see Andrew Loke, “The Benefits of Studying Philosophy for Science Education,” *Journal of the National University of Singapore Teaching Academy*, 4/1: 27-35.

9. Alvin Plantinga, *God, Freedom, and Evil* (Grand Rapids, MI: Eerdmans, 1974; repr., 2001), 1.

uncover it.” Scientism, however, is thereby naive, assuming a certain philosophy of science, even a certain metaphysics, without knowing it. Contained in this special issue, John A. Bloom and Joshua M. Moritz’s respective contributions explicate this idea in detail well. The philosopher of science insists that it is better to ponder and explicate one’s assumptions and thereby arrive at better conclusions than it is simply to assume and remain unaware of said assumptions.<sup>10</sup> Hence the importance of the subject. A subject that uncovers our basic assumptions about the world is a subject worth studying.

## **2. The Philosophy of Science Helps Us to Imagine Our Story**

The study of Scripture is the most central means of uncovering our story. We are a particular people that believe that Jesus is Lord, the fulfillment of the Old Testament covenants, and thus a person who is both fully God and fully human. Our story is also framed by the way we answer particular questions in the philosophy of science. Different answers can change the way we imagine the past. Consider, for example, the historical perspective of young-earth creationism: the earth’s history is quite young, perhaps 6,000 to 10,000 years. Therefore, dinosaurs and humans were contemporaries, the fossil record is a result of the flood, perhaps God created the world with the appearance of age, etc.<sup>11</sup> Now, contrast this view with old-earth creationism, which follows the contemporary consensus on geological age; or, with evolutionary creationism, which further suggests that, while God stands sovereign over creation, he uses evolution as his tool. Each view is propelled by different particularized readings of Genesis 1-2, and also by different assumptions regarding the nature of scriptural meaning, scientific evidence and consensus, the extent of human knowledge, and so on.<sup>12</sup> In the end, each view assumes a different view of God’s action in relationship with the world (i.e., the doctrine of providence). Depending upon how a person understands the nature and explanatory power of certain scientific models, such as evolution, the person might have a different understanding of what our history looks like. The point should be evident that the philosophy of science has important consequences for how we imagine the story from where we came. Certainly, Christians believe God created and sustains the world, but what (if any) means did/does he use in such creation, sustaining, and governance? To list a few,

10. For examples of this done well, see John A. Bloom, *The Natural Sciences: A Student’s Guide* (Wheaton, IL: Crossway, 2015); Bruce L. Gordon and William A. Dembski, eds., *The Nature of Nature: Examining the Role of Naturalism in Science* (Wilmington, DE: Intercollegiate Studies Institute, 2011); and Stump, *Science and Christianity*.

11. For a defense of the young-earth position, which suggests that it best fulfills an Augustinian type of theodicy, see Kurt P. Wise’s article in this issue. For a broader defense, see Kurt P. Wise, *Faith, Form, and Time: What the Bible Teaches and Science Confirms about Creation and the Age of the Universe* (Nashville, TN: B & H, 2002).

12. For a summary here, see Josh A. Reeves’s article in this issue.



the views of young-earth, old-earth, and evolutionary creation each give a different description of the earth's history.<sup>13</sup>

### 3. The Philosophy of Science Uncovers Knowledge of God

On a personal level, it is fascinating to note that sometimes the same Christians who are so (rightly) invested and diligent in their studies of Scripture are the same Christians that ignore or underplay the value of science and the need for a philosophy of it. If Christians are right that God created the universe and everything in it, then it reflects who God is—his holiness, goodness, order, beauty, and harmony. The thirteenth-century Franciscan theologian, Bonaventure, nicely summarizes this latter perspective: “the entire world machine was brought into existence . . . by one First Principle [who] has arranged all things in measure, number, and weight.”<sup>14</sup> The theological foundation of the world, therefore, implicates that the study of the world uncovers some level of knowledge of God. This is why Bonaventure, and much of the Christian tradition before and after him, speaks of the two books of God's knowledge: Creation and Scripture.<sup>15</sup> The Triune God spoke (Word) the universe into existence, filling and animating all things through his Spirit; in a similar manner, the Triune God spoke (Word) Scripture into existence, and animated every word through his Spirit. The same Father through the same Son through the same Spirit created both. John Calvin, following within this trajectory, thus continues,

If we regard the Spirit of God as the sole foundation of truth, we shall neither reject the truth itself, nor despise it wherever it shall appear, unless we wish to dishonor the Spirit of God . . . Shall we say that the philosophers were blind in their fine observation and artful description of nature? . . . No, we cannot read

13. For an introduction to these issues, see J. B. Stump, ed., *Four Views on Creation, Evolution, and Intelligent Design* (Grand Rapids, MI, Zondervan, forthcoming November 2017).

14. Bonaventure, *Breviloquium*, trans. Dominic V. Monti, in *Works of Bonaventure*, vol. 9 (Saint Bonaventure, NY: Franciscan Institute, 2005), 59 (2:1.1). Bonaventure is not original here, but rather he is reflecting the profession of faith of the Fourth Lateran Council (1215). The rest of his discussion (pgs. 60-98) extrapolates the meaning of his quoted statement.

15. *Ibid.*, 72 (2:5.2); 96 (2:12.1). Take, for example, Augustine: “In your great wisdom you, who are our God, speak to us of these things in your Book, the firmament made by you” (Augustine, *Confessions*, trans. F. J. Sheed (New York: Barnes & Noble, 1992), 326 (13.18); see also Augustine, *The Literal Meaning of Genesis*, in *Ancient Christian Writers*, vol. 41, trans. John Hammond Taylor (New York: Paulist, 1982), 64-66 (1.19). “Two book” theology is especially popular within the Reformed tradition. While apparent in Calvin (1:14.20), it is best reflected in the Belgic Confession: “We know [God] by two means: First, by the creation, preservation, and government of the universe; which is before our eyes as a most elegant book, wherein all creatures, great and small, are as so many characters leading us to see clearly the invisible things of God, even his everlasting power and divinity, as the apostle Paul says (Rom. 1:20). All which things are sufficient to convince men and leave them without excuse. Second, He makes Himself more clearly and fully known to us by His holy and divine Word, that is to say, as far as is necessary for us to know in this life, to His glory and our salvation” (“The Belgic Confession. A.D. 1561. Revised 1619,” in *The Creeds of Christendom with a History and Critical Notes*, ed. Philip Schaff, 4th ed. (Grand Rapids, MI: Baker, 1977), 3:384 (article 2).

the writings of the ancients on these subjects without great admiration . . . *But if the Lord has willed that we be helped in physics, dialectic, mathematics, and other like disciplines, by the work and ministry of the ungodly, let us use this assistance. For if we neglect God's gift freely offered in these arts, we ought to suffer just punishment for our sloths.*<sup>16</sup>

Calvin notes that, since the Spirit is the author of truth in his creation, he requires the due diligence of Christians to study and appreciate the beauty and harmony of it. It would be silly (and slothful!) to ignore the philosophy of science.

Calvin here reflects the claims of the Apostle Paul: in our Lord “all things in heaven and on earth were created . . . through him and for him” and “in him all things hold together” (Col. 1:16-17, NRSV). If Christ is the creator and sustainer of all things, then science by definition would be the study of his creating and sustaining.<sup>17</sup> The universe, therefore, is like words on a page for the observer to read. As David reflects,

The heavens are telling the glory of God;  
and the firmament proclaims his handiwork.  
Day to day pours forth speech,  
and night to night declares knowledge (Ps 19:1-2).

Christians study the world because it reveals the knowledge of God (i.e., science); they thus must consider how to study the world well lest they misinterpret, misapply, or misimagine the revelation of God (i.e., philosophy of science). The task is mightily important for the Christian to consider.

#### **4. The Philosophy of Science is a Beautiful and Sanctifying Encounter with the Almighty God**

We are made to contemplate God, that is, to be raptly attentive to the Triune God.<sup>18</sup> In other words, we are made to gaze upon God and be transformed. This process occurs through the new covenant (see 2 Cor 3:16-18), and it is also our *telos*: “when [God] is revealed, we will be like him, for we will see him as he is” (1 John 3:2).<sup>19</sup> Thus, we also are called to be gazers of God in the present, even if we only see dimly: “For now

16. John Calvin, *Institutes of the Christian Religion*, ed. John T. McNeil, trans. Ford Lewis Battles (Louisville, KY: Westminster John Knox, 2006), 2:2.15-16; italics mine.

17. This is why Herman Bavinck argued that “theology has nothing to fear from thorough, multifaceted research [from the natural sciences]” (Herman Bavinck, *Reformed Dogmatics: God and Creation*, ed. John Bolt, trans. John Vriend [Grand Rapids, MI: Baker Academic, 2004], 2:507).

18. “Contemplation is rapt attention to God the cause of all things rather than to the things of which he is the cause” (John Webster, “What Makes Theology Theological?” *Journal of Analytic Theology* 3 [May 2015]: 24). It consists of “the simple act of gazing on the truth” (Thomas Aquinas, *Summa Theologiae* [Lander, WY: The Aquinas Institute, 2012], IIaIIae.180.3, ad 1).

19. For the full argument, see Ryan A. Brandt, “Gospel-Centered Contemplation: A Proposal,” in *Contemplation and Contemplative Prayer: A Guide for Evangelicals*, ed. John Coe and Kyle Strobel (Downers Grove: IVP Academic, forthcoming 2018).

we see in a mirror, dimly, but then we will see face to face. Now I know only in part; then I will know fully, even as I have been fully known” (1 Cor 13:12). One way we can gaze upon God in the present, so to speak, is through his work of creation. Even the well-known scientist and agnostic, Carl Sagan, recognized the worship-inducing aspect of the world, stating, “I would suggest that science is, at least in part, informed worship.”<sup>20</sup> Sounding Schleiermacherian,<sup>21</sup> he elsewhere says, “By far the best way I know to engage the religious sensibility, the sense of awe, is to look up on a clear night.”<sup>22</sup> If even an agnostic considers studying the world to be a sacred encounter, how much more should the Christian who knows the Creator it reflects?

Indeed, the study of the world brings us to worship and a sense of awe: “The heavens are telling the glory of God” (Ps 19:1). Reflective thought of his creation seems not only helpful but also necessary to appreciate the beauty and wonder of God and his created world. In other words, science, and the philosophy of doing it, help us to imagine something much larger than us, something greater than the monotony of 40-hour work weeks, of the value of our possessions, and of eyes focused on the remedials of life. This is one reason we go to unique locations with breathtaking views. It is why we get lost in staring, pondering, and imagining. We seek out beauty and it changes us, for we are made to gaze upon God and be changed. Philosophy of science is a way of practicing this sacred dance. It is a way of appreciating truth and beauty and yet noting that, while the world is reflective of God as it images him, its beauty still falls surpassingly short of the final gaze, the Beatific Vision. Even more, pondering the vastness of it is a small analogy to pondering the unsearchable depths of God (see Ps 145:3; Isa 40:28).

## **5. Philosophy of Science Helps Us to Avoid Becoming Reductionistic in Our Thinking of the God-World Relation**

Christians have often claimed (and rightly so) that Humeian empiricism and its twentieth-century extension, logical positivism, are reductionistic.<sup>23</sup> Choosing between the empirical, concrete experiences and the transcendent, intangible realities, these thinkers chose only the former. Indeed, they thought, if there is a natural or scientific explanation, then God (or the soul, free will, etc.) need not be part of the equation.<sup>24</sup> Rudolf Bultmann reflects this perspective with his famous words: “We

20. Carl Sagan, *The Varieties of Scientific Experience: A Personal View of the Search for God*, ed. Ann Druyan (New York: Penguin, 2007), 31.

21. Friedrich Schleiermacher was well-known for suggesting that true religion is the “feeling of absolute dependence” (Friedrich Schleiermacher, *The Christian Faith*, ed. H. R. Mackintosh and J. S. Stewart [Berkeley, CA: Apocryphile, 2011], 17).

22. Sagan, *The Varieties of Scientific Experience*, 2.

23. Humeian empiricism is an empirically-based school of philosophy that stemmed from David Hume.

24. See, for example, David Hume, *Inquiries concerning Human Understanding and concerning the Principles of Morals*, ed. L. A. Selby-Bigge (Oxford: Clarendon, 1975).

cannot use electric lights and radios and, in the event of illness, avail ourselves of modern medical and clinical means and at the same time believe in the spirit and wonder world of the New Testament.”<sup>25</sup> In other words, somehow the transcendent wonder of the Bible is undone by our understanding and use of modern technologies.

While many Christians might intuitively understand where Bultmann goes wrong in his reasoning, Christians can be prone towards the same reductionistic problems without proper thinking, that is, without the philosophy of science. The real desire to show that “God did it” can sometimes make Christians erect conceptual dichotomies between two realities that are both true, even though this schema might prevent them from seeing it. Sometimes this tendency looks the opposite from the naturalistic worldview: If God did it, then there must not be a scientific explanation, and a scientific explanation might cause me to question my faith.<sup>26</sup> This tendency can be seen historically within various debates in science, including the Noahic flood, the generation of bacteria, and, more infamously, the heliocentric controversy.<sup>27</sup> The problem is extended today through the controversies surrounding evolution and the Christian faith.<sup>28</sup> A way forward in these debates (though many more questions will need answer to fully solve the problem) is overcoming a reductionistic mindset. Proper thinking within the philosophy of science—especially, in this case, the limits of science and its relationship to other disciplines—would help traverse and amend the apparent difficulty.<sup>29</sup>

In summary, philosophy of science is a subject worth studying for anyone, especially for those people who are committed Christians in the biblical and theological fields. The philosophy of science helps to explicate our committed but unconscious assumptions, to imagine our story, to uncover knowledge of God, to gaze upon God in a beautiful and sanctifying encounter, and to avoid becoming reductionistic in our thinking of the God-world relation.

25. Rudolf Bultmann, *New Testament and Mythology and Other Basic Writings*, trans. Schubert M. Ogden (Minneapolis: Fortress, 1984), 4.

26. For a helpful reflection here, see Alvin Plantinga, *Where the Conflict Really Lies Science, Religion, and Naturalism* (Oxford: Oxford University Press, 2011).

27. See David C. Lindberg and Ronald L. Numbers, eds., *When Science and Christianity Meet* (Chicago: University of Chicago Press, 2003); and Richard G. Olson, *Science and Religion: From Copernicus to Darwin* (Baltimore: John Hopkins University Press, 2004). For a more popular treatment, see McGrath, *Science & Religion*, 7-32. For a broader treatment of the interdependent relationship of religion and science, see Joshua M. Moritz, *Science and Religion: Beyond Warfare and Toward Understanding* (Winona, MN: Anselm Academic, 2016).

28. For a helpful and accessible survey of the evolution debate and its effect on Christianity, see McGrath, *Science & Religion*, 33-42. For a defense of evolutionary creation, see J. B. Stump’s article in this issue.

29. For an engaging reflection along these lines, see Stephen Donaldson’s final article in this issue.

## **An Introduction to the Special Issue: Christianity and the Philosophy of Science**

While this issue is not meant to be a cohesive whole, each article broadly introduces the subject of the relationship between God and the world.

The first two articles helpfully introduce the reader to some of the larger issues surrounding the relationship between Christianity and science. Josh A. Reeves's contribution frames the discussion around three fundamental questions, which he argues, when answered, will effectively decide the various positions that a Christian might have on matters of philosophy of science: (1) does the Bible contain modern scientific theories, (2) how much can non-Christians know, and (3) how far does science reach? John A. Bloom, a scientist and a theologian, asks and answers the important question: Can science answer life's fundamental (theological and philosophical) questions? His response is no, and he shows science's shortcoming in various ways, also suggesting that theistic evolution is an improper solution.

Joshua M. Moritz contributes to the discussion through his (mostly) historical work. Surveying the history of the philosophy of science, he notes that science presupposes the very metaphysical assumptions that theistic religion, and in particular Christianity, provides. Moritz thus concludes that science does indeed need faith. R. Clinton Ohlers's article, also historically orientated, investigates the "conflict thesis" between science and religion, focusing particularly on the nineteenth century with the rise of the Victorian scientific naturalists. Ohlers's work evaluates the rise of the conflict thesis, noting that the two authors of the conflict thesis, John William Draper and Andrew Dickson White, held to and even championed theological views in their works. He then shows how the thesis is still influential today, particularly, he argues, in shaping the discourse on divine action addressed in the works of Alvin Plantinga, Lydia Jaeger, and James Stump. Ohlers also critiques the "God of the Gaps" objection as an invention of the late nineteenth century.

The following article, by James (J. B.) Stump, defends evolutionary creation against popular misconceptions of the position, first, by defending the terminology against the more common "theistic evolution," and then, by responding to four typical theological concerns about evolutionary creation. The theological concerns that he tackles are (1) the origin of sin and the need for a savior, (2) human uniqueness and the image of God, (3) divine action and deism, and (4) the problem of evil and the goodness of God.

Bruce L. Gordon's article is a substantial summary of modern scientific cosmology and quantum physics that draws out their implications for theological and philosophical views of God's creative and providential action in nature. The article also includes a discussion of the ways in which the universe is fine-tuned for life and how the strategies used by scientists trying to explain away this fine-tuning "both fail



and undermine scientific rationality in the process.” Students and scholars alike will find much information to mine and ponder in this lengthy article.

Kurt P. Wise’s article notes a lack of awareness in the literature of what he calls paleoevil, that is, natural evil that can be inferred from the geological record. He summarizes the massive extent of this paleoevil and then reasons that the old earth and evolutionary perspectives cannot adequately (biblically, theologically, or philosophically) account for it within their views. He engages with the recent theodicies developed by Alvin Plantinga and William Dembski, respectively, and then notes that they both fail in various ways: the former, he says, is not consistent with biblical angelology and the latter is not consistent with biblical theology. He concludes that only an Augustinian type of theodicy can adequately explain paleoevil, and then only a young-earth view of earth history is consistent with this type of theodicy.

Finally, Steve Donaldson offers a reflection that concludes the special issue with a cautionary tale of the human propensity towards having the “final word” on a matter, especially as it relates to the philosophy of science. The article tackles the common binary fallacy, the limitations of science, and the inclination we sometimes have of making God too small in our philosophical and theological thinking.

I noted before that the articles vary in their level of readability. Several articles are addressed to beginning and intermediate undergraduate students, such as the contributions from Josh Reeves, John Bloom, and J. B. Stump. If you are a student or new to the field of philosophy of science, it might be a good idea for you to start here. The articles will also provide conversational sparks for those scholars in the field. Other articles, while readable for an intermediate audience, are more particularly addressed to the scholarly community as a whole, including the contributions of Joshua Moritz, Kurt Wise, R. Clinton Ohlers, and Bruce L. Gordon.

As a final note, each of these articles are written by scholars whose point of view is different from the next. While parts of this issue read cohesively, the reader should remember that contributors disagree about fundamental questions in the philosophy of science. What is science? How much of the contemporary “scientific consensus” is valid? Is the earth young or old? Is evolutionary creation or theistic evolution a viable option for the Christian? Regarding the last question, for example, readers should contrast the views of J. B. Stump, Josh A. Reeves, and Steve Donaldson, each of whom argues (explicitly or implicitly) for evolutionary creation, with the views of John A. Bloom, R. Clinton Ohlers, and Bruce L. Gordon, who contend for Intelligent Design (and against evolutionary creation). This question, and many other questions, will be addressed in different ways in this special issue of the *Journal of Biblical and Theological Studies*.

## ***Science and Christianity: The Three Big Questions***

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**Abstract:** I will present in this paper three major questions that shape background assumptions on matters of science and Christianity. The questions are the following: Does the Bible contain modern scientific theories, how much can non-Christians know, and how far does science reach? Depending on how one answers these questions, Christians will likely reach different conclusions about scientific data, regardless of how carefully they research the topic. By examining important background assumptions, my intent is to help make conversations about Christianity and science more fruitful.

**Key Words:** Christianity and science, biblical interpretation, concordism, theistic science, philosophy of science

### **Introduction**

There has been a lot of commentary recently in the media concerning the rise of a post-truth society, where the public cannot even agree upon facts that could help decide between competing theories. The reality is this divide—where competing groups reside in different intellectual universes—has been a feature of evangelical views of science for decades. Conservative Christians have long objected to claims backed by scientific consensus, such as the age of the earth or the common ancestry of biological life, offering alternative theories for scientific observations.

Christians who wish to engage modern science from a theological perspective have two general options from which to pick: either the Christian community is embarrassing itself by not accepting what scientists have discovered about the world, or science itself is untrustworthy because naturalistic assumptions distort many scientific conclusions. Like some who heard Jesus's parables and did not understand (Matt 13:10-23), scientists may have eyes but lack the ability to truly see. Which option should the discerning Christian choose? Does one side with mainstream science because it is, despite fundamentalist worries, the most reliable way of discovering truths about the natural world? Or should Christians hold onto traditional beliefs despite mockery from the "worldly wise," whose foolishness God will reveal on the last day?

One way to pick between these competing options is to examine how each side handles a current controversy between science and Christianity. Read different

books about evolution, for example, and decide for yourself what you believe. Are the individual arguments for evolution persuasive? Though this approach has value, in my experience teaching undergraduates, this is not the best strategy for beginners. There are often many unexamined background assumptions that skew any independent assessment one might make. Without enough background knowledge, one cannot offer a fair judgment, relying upon unarticulated intuitions instead of careful consideration of the relevant arguments.

In this paper, I will present what I judge to be the three major questions that shape one's background assumptions on matters of science and faith. Depending on how one answers these questions, Christians will reach different conclusions about the scientific data, regardless of how careful or intensive they research the topic. In other words, without a more careful consideration of the presuppositions that shape the way Christians view modern science, debates on the age of the earth or evolution will generate little agreement from opposing sides, since their starting assumptions begin too far apart. By examining important background assumptions, my intent is to help make conversations about matters of science and faith more productive.

### **Question One: Does the Bible Contain Modern Scientific Theories?**

As one might expect, the biggest issue that separates Christians over science concerns biblical interpretation. I avoid framing the issue about whether one should accept the Bible as literally true because, among other things, this question does not respect the diversity of genres in the Bible. The Bible contains poetry, stories, proverbs, parables, visions, and so forth; to insist that each passage must be rendered literally is to misread the text in many circumstances. For example, to conclude from references to the hand of God (Psalm 145:16, Exodus 33:22-23) in the Old Testament that God has an actual body is to miss the author's intended meaning. The author's intended meaning is at issue in debates over interpreting Genesis: are the first chapters of the Bible a reasonably accurate description of the origins of the earth, or are they primarily poetic in nature, meant to provide a theological response to the origin stories of the cultures surrounding the ancient Israelites?

A more useful question is the following: "Does the Bible contain modern scientific theories?" Do we have a Bible that is, by supernatural guidance, correct in every detail on which it touches, and thus whose divine origin can be proven by the objective standards of science? Or do we have an inspired text whose outlook is conditioned by the language, culture, and views of the natural world at the time it was originally written? Advocates of the former position are called concordists, who believe the Bible must agree—be in concord with—all the findings of contemporary science.<sup>1</sup>

1. John Walton, *The Lost World of Genesis One: Ancient Cosmology and the Origins Debate* (Downers Grove, Ill: IVP Academic, 2009), 19. Walton himself is not a concordist.

Many conservative Christians are concordists who approach the Bible as a supernatural text. One of the founders of the scientific creationist movement, Henry Morris, says for example: “Whenever [the Bible] deals with scientific or historical matters of fact, it means exactly what it says and is historically accurate. . . . The Bible is a book of science!”<sup>2</sup> Another advocate of this general approach is the astronomer, Hugh Ross, founder of the old-earth creationist ministry *Reasons to Believe*. He says,

The justification I hear more often than any other for leaving the Bible behind is that ‘everyone knows’ it is antiquated and full of scientific nonsense. . . . Amazingly, when I ask people to cite examples, many cannot bring to mind even one. . . . Genesis chapters 1-11 present a history of the universe, Earth, life, and early humanity. With the help of many remarkable advances in astronomy, physics, geo-physics, chemistry, paleontology, biochemistry, and anthropology, the words of the first eleven chapters can be subjected point by point to rigorous investigation. They can be verified or refuted with greater precision and to a greater depth than previous generations might have imagined possible.<sup>3</sup>

For Morris, Ross, and many other evangelicals, one cannot say the Bible is true and trustworthy unless it is correct in its scientific details.

Perhaps the strongest argument in favor of a concordist approach is that it provides the most natural way to read the text, which is why many Christian commentators throughout church history have assumed that Genesis can be reconciled with the dominant cosmology of their own period. And when the answer of how to reconcile them was unclear, many biblical interpreters assumed it was due to a lack of human understanding of the physical world. For example, Luther struggled to make sense of the water that exists above the firmament (Gen 1:4) in light of Aristotelian cosmology. Unable to find a suitable answer, he said: “But Moses says in plain words that the waters were above and below the firmament. Here I, therefore, take my reason captive and subscribe to the Word even though I do not understand it.”<sup>4</sup> Concordists would also argue that their way of reading Scripture provides an important way of reaching secular scientists and other nonbelievers for the gospel: if the Bible gets its scientific facts right, then we can trust it is divine in origin.

For advocates of the non-concordist view, the attempt to find modern scientific theories in Scripture does not respect the original meaning of God’s Word or God’s manner of giving revelation, which is accommodated to the cultures receiving it. While it is always possible given human interpretive ingenuity to find modern

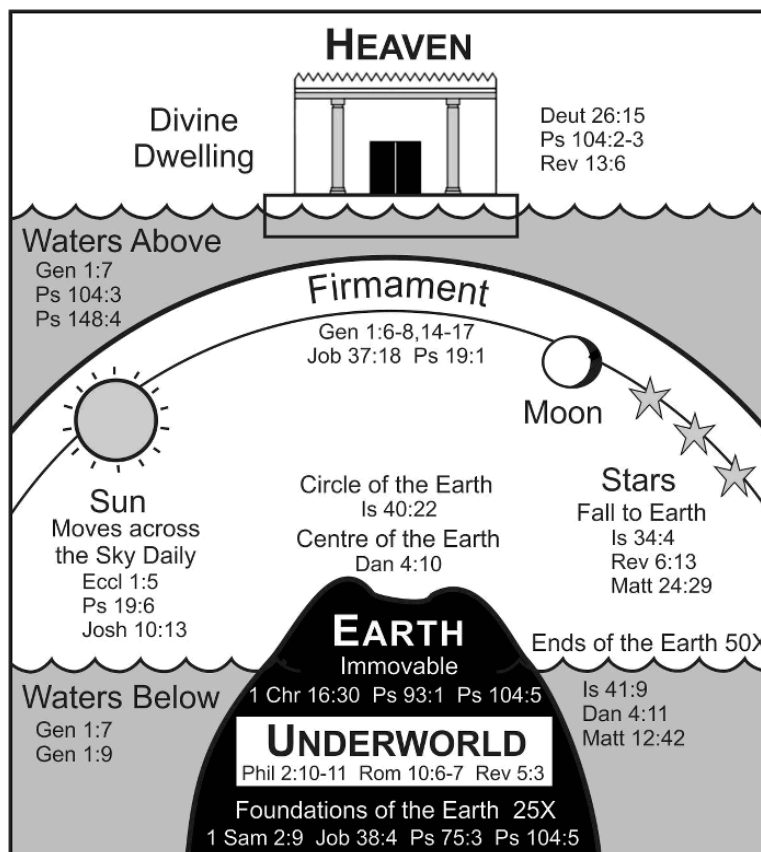
2. Henry M. Morris and Henry M. Morris III, *Many Infallible Proofs: Evidences for the Christian Faith* (Green Forest, AR: New Leaf, 1974), 238.

3. Hugh Ross, *Navigating Genesis: A Scientist’s Journey through Genesis 1-11*, ed. Kathy Ross, Joe Aguirre, and Sandra Dimas (Covina, CA: RTB, 2014), 9.

4. As quoted in Kyle Greenwood, *Scripture and Cosmology: Reading the Bible Between the Ancient World and Modern Science* (Downers Grove, Ill: IVP Academic, 2015), 153.

scientific theories hidden in the biblical text, this gives to Scripture meanings that would not be recognizable to its original audience.

The easiest way to see the arguments for a non-concordist approach to Scripture is to examine the view of nature (i.e., the cosmology) assumed by its writers, who held views that we could not possibly accept today.<sup>5</sup> Here are a sampling of verses related to cosmology: the earth does not move (1 Chr 16:30; Ps 93:1), the earth has foundations (Ps 104:5), the earth has ends (Ps 48:10, Dan 4:10-11), the earth is circled by a circumferential sea (Prov 8:27, Job 26:10), the earth is covered by a hard dome (i.e., firmament) (Gen 1:4), heaven is a physical place in sky (Isa 40:22, Ps 104:2-3, Deut 26:15), stars are in the firmament (Matt 24:29, Rev 6:13), and there is an underworld (Num 16:28ff, Phil 2:10). Putting all these different descriptions of the natural world together, one gets the image of a three tiered-universe, as pictured below.<sup>6</sup>



5. Denis Lamoureux, *Evolution: Scripture and Nature Say Yes* (Grand Rapids, MI: Zondervan, 2016). See also Denis Lamoureux, "Science-Religion Web Lectures," *Science-Religion Web Lectures*, accessed May 5, 2017, <https://sites.ualberta.ca/~dlamoure/wl.html>.

6. The figure is found here: BioLogos, "Interpreting Adam: An Interview with Denis Lamoureux, Part 1," *BioLogos*, accessed May 5, 2017, <http://biologos.org/blogs/jim-stump-faith-and-science-seeking-understanding/interpreting-adam-an-interview-with-denis-lamoureux-part-1>.



From a non-concordist perspective, there are clearly many places in Scripture that assume an ancient view of the natural world, one that is incompatible with modern science. Many Christians today read these passages poetically, assuming that the biblical writers generally held views of the universe that we would accept today. But as many Old Testament scholars have demonstrated, the Israelites viewed the universe in the same prescientific way as the cultures surrounding them.<sup>7</sup> As John Walton summarizes the non-concordist argument, “[the] Ancient Israelites did not know the stars were suns; they did not know that earth was spherical. . . . They believed that the sky was material (not vaporous). . . . Most importantly, God did not think it important to revise their thinking. There is not a single instance in which God revealed to Israel a science beyond their own culture.”<sup>8</sup> Such a view need not be seen as attacking the truthfulness of Scripture. Charles Hodge, for example, was a leading nineteenth-century theologian at Princeton Theological Seminary and was known for defending the doctrine of biblical inerrancy. He said,

As to all matters of science, philosophy, and history, [the sacred writers] stood on the same level with their contemporaries. They were infallible only as teachers, and when acting as the spokesmen of God. Their inspiration no more made them astronomers than it made them agriculturists. . . . [W]e must distinguish between what the sacred writers themselves thought or believed, and what they teach.<sup>9</sup>

Hodge himself argues that the writers of Scripture believed the sun moved around the earth but they nowhere taught this as part of Christian doctrine. If one insists that the Bible’s trustworthiness depends on its scientific accuracy, then one must either ignore these passages or creatively interpret them in ways that the original audience would not have understood.

In my opinion, the contribution of biblical scholarship to understanding the background and context of Scripture has changed the terms of the debate. I do not see in Scripture the mere use of observational language (e.g., we say the sun rises because that is what it looks like from a human perspective), but a cosmology that goes beyond everyday experience. It is not clear to me, therefore, how one can be a consistent concordist without also believing in a stationary earth with God residing above the firmament in the heavens.

7. See Greenwood, *Scripture and Cosmology*, chapter 2.

8. Walton, *The Lost World of Genesis One*, 19.

9. Charles Hodge, *Systematic Theology: Volume One* (New York: Charles Scribner, 1871), 165, 171.

## **Question Two: How Much Can Non-Christians Know?**

In the contemporary world, scientists are normally recognized as the foremost authority for understanding how nature works. When scientists make claims about the world, however, there is always a question of their authority to do so: who are they, what do they know, and why should they be trusted? As polling data shows, American evangelical Christians appear to be especially prone to expressing doubts about scientific theories—even those that have achieved consensus within the scientific community—and therefore to questioning the expertise of those proposing the theories. For example, in the 2015 *Religion, Values, and Climate Change Survey*, 64% of evangelicals were somewhat or very unconcerned with climate change; this constituted the highest number of any group surveyed.<sup>10</sup> Despite a generally positive attitude towards science itself—Christians frequently use scientific arguments to bolster theological claims—many Christians argue that mainstream scientists cannot be trusted in their conclusions about the natural world.

What explains this skepticism? The hostility of American evangelicals towards scientific expertise appears to be rooted in part in a particular theological epistemology, which says creation cannot be properly understood apart from the indwelling of the Holy Spirit and the knowledge given by revelation in the Bible.<sup>11</sup> Thus, the second big question between science and Christianity is: How much can non-Christians know about the world?

Christian skepticism about secular learning can be traced back to the New Testament. The Apostle Paul, for example, argues in First Corinthians (1:20-21): “Where are the wise? Where is the teacher of the law? Where is the philosopher of this age? Has not God made foolish the wisdom of the world?” Taken on its own, this verse might suggest that secular knowledge is dangerous because philosophers lack God-given insight into the nature of reality. This New Testament theme about not trusting worldly wisdom reappears often in Christian history, as exemplified by the famous question posed by Tertullian in *The Prescription Against Heretics* around the beginning of the third century: “What has Athens to do with Jerusalem?” (i.e., classical philosophy with Christian doctrine). It can also be seen in Luther’s attack on Roman Catholicism as the “church of Aristotle.”<sup>12</sup> Pagan philosophy could be seen as

10. Robert P. Jones, Daniel Cox, and Juhem Navarro-Rivera, “Believers, Sympathizers, & Skeptics Why Americans Are Conflicted about Climate Change, Environmental Policy, and Science: Findings from the PRRI/AAR Religion, Values, and Climate Change Survey” (Washington, D.C.: Public Religion Research Institute, 2014), available at <https://www.prri.org/wp-content/uploads/2014/11/2014-Climate-Change-FINAL1-1.pdf>.

11. For the full argument, see Josh Reeves, “Theology and the Problem of Expertise,” *Theology Today* 69.1 (February 2012): 34–42.

12. Peter Harrison, “Philosophy and the Crisis of Religion,” in *The Cambridge Companion to Renaissance Philosophy*, ed. James Hankins (Cambridge: Cambridge University, 2007), 236.

an unhelpful distraction from divinely revealed knowledge and encouraged the vice of curiosity, which had such tragic results for the occupants of the Garden of Eden.<sup>13</sup>

Many Christians believe that in the fallen world in which we live, the Bible can only be seen properly by those indwelt by the Spirit, those who now have the “eyes to see.” It is the Holy Spirit who bears witness to the Bible’s divine origin and its essential message, meaning that biblical doctrine should not be abandoned when met by skepticism and ridicule by nonbelievers. Thus as J. P. Moreland argues: when confronted with a theory of evolution, which is accepted by the overwhelming consensus of biologists, Christians should not relinquish their beliefs but instead hold their ground so that they may eventually win the “argument due to hard-hitting scholarship and confidence in the Bible.”<sup>14</sup> By revising their beliefs in light of modern science, theistic evolutionists “inexorably” give off a message that theology and biblical teaching do not give us knowledge. Moreland asks, “Do we . . . set aside or revise two thousand years of Christian thinking and doctrinal/creedal expressions in order to make Christian teaching acceptable to the neuroscience department at UCLA or the paleontologists at Cambridge?”<sup>15</sup> To revise one’s thinking is to acknowledge that biblical interpreters throughout history have erred and thus have not been guided by the Holy Spirit.

Many Christians who promote skepticism towards science use Augustine to support their views. The philosopher Alvin Plantinga has argued, for example, for what he calls “Augustinian science,” which is science that is used “in service of a broadly religious vision of the world.”<sup>16</sup> From Augustine, says Plantinga, we learn that human history is the struggle between the City of God and the Earthly city, with no neutral ground in between. Because there is no such thing as a neutral science, the Christian cannot automatically accept the word of scientists. The Christian community should undertake its own type of science, which looks at the human and natural sciences “from an explicitly theistic or Christian point of view.”<sup>17</sup> From this perspective, Christians should mistrust scientists because they do not know what they claim to know.

Against the view of Moreland and Plantinga, I would argue that they underappreciate the epistemic abilities of non-Christians, for in practice Christians operate on the basis of secular scientific experts all the time. Most of the facts that we believe about the natural world—that water is composed of one hydrogen and two oxygen atoms or that we live in a solar system in a vast expanse of space—are beliefs that we

13. Peter Harrison, “Curiosity, Forbidden Knowledge, and the Reformation of Natural Philosophy in Early Modern England,” *Isis* 92 (2001): 267.

14. J. P. Moreland, “Theistic Evolution, Christian Knowledge and Culture’s Plausibility Structure,” *Journal of Biblical and Theological Studies* 2.1 (2017): 5.

15. *Ibid.*, 6.

16. Alvin Plantinga, “Science: Augustinian or Duhemian?,” *Faith and Philosophy* 13, no. 3 (1996): 370.

17. *Ibid.*, 369.

have accepted from scientific experts who often do not share my Christian worldview. Why trust scientists in one area (e.g., a new medical treatment or a new technology) but not another? Or to relate this to Paul's argument in First Corinthians, why assume that scientists represent the false wisdom of this world in the twenty-first century? Are doctors also the worldly wise? Stock brokers? Car mechanics? A generalized skepticism towards non-Christian learning leads to untenable conclusions that are inconsistent with how Christians live their lives. I would agree that one should not give scientific experts a philosophical blank check, but the evaluation of scientific theories is best done by Christians who have the skills and competence to assess the current state of evidence, rather than from those casting stones from outside the discipline. The idea that scientists represent the ignorant wisdom of the world is what needs to be proven, rather than automatically assumed.

Framing the issue as between the Holy Spirit/Bible and foolish human opinion oversimplifies complex issues and can give us false confidence in our opinions. In other words, we think we are trusting the Bible when in fact we are trusting our own "commonsense" view of the world. A student of Martin Luther reported him to say this about Copernicus' theory that the earth orbits the sun: "So it goes now . . . Whoever wants to be clever . . . must do something of his own. This is what that fellow does who wishes to turn the whole of astronomy upside down. . . . I believe the Holy Scriptures, for Joshua commanded the Sun to stand still, not the Earth."<sup>18</sup> Like Moreland, Luther frames the problem as whether one should believe human opinion or divine revelation. Upon retrospect, however, we can see that Luther should have been more open to the arguments put forth by Copernicus and other astronomers. Science should not dictate the meaning of Scripture to the church, but since nature is another book written by God, we should not expect places where they disagree. Whenever we have scientific results which conflicts with the Bible, it is the job of the interpreter to bring them back into alignment. Thus with the benefit of science and hindsight, we no longer have a problem recognizing the earth is stationary is not what Scripture teaches. Science can lead us to approach the Bible with new questions, making sure we are not imposing our own expectations onto the text.

I also do not think Augustine would be an advocate of "Augustinian science" as described by Plantinga. Augustine himself recognized that a strong skepticism to scientific inquiry could injure the faith: if Christians cannot be trusted on what can be empirically verified, then how can they be trusted on spiritual matters? Augustine left a rival religion to Christianity after he found its leader proffering bad science, saying, "It was providential that this man talked so much about scientific subjects, and got it wrong."<sup>19</sup> The inability to see truth in the publically-accessible physical realm, which

18. Owen Gingerich, *The Book Nobody Read: Chasing the Revolutions of Nicolaus Copernicus* (New York: Bloomsbury, 2009), 136. For questions about what Luther actually said, see Greenwood, *Scripture and Cosmology*, 171.

19. Saint Augustine, *Confessions*, trans. Maria Boulding (Hyde Park, NY: New City, 1996), 118.

was put forth by the scientists of Augustine's period, meant that this religious leader was not to be trusted about truths in the spiritual realm. More generally, Augustine recognizes that we can draw conclusions about nature based only on reason and experience, without the help of divine revelation. As he says,

Often a non-Christian knows something about the earth, the heavens, and the other parts of the world, about the motions and orbits of the stars and even their sizes and distances . . . and this knowledge he holds with certainty from reason and experience. It is thus offensive and disgraceful for an unbeliever to hear a Christian talk nonsense about such things, claiming that what he is saying is based in Scripture.<sup>20</sup>

It is not only disgraceful when Christians spread scientific misinformation to nonbelievers, but it can cause grave spiritual injury when believers discover they have accepted bad scientific information from their pastor or church. If Christians ignore what scientists and other expert communities have discovered about the world, they do so at the peril of the church. Unless the church can bring itself to trust in the best knowledge of the modern world, the modern world will have little reason to trust in return.

I thus would resist the call for Christians to start their own "theistic science." A better position is to affirm that secular scientists may not be wrong when they make empirical claims (i.e., inference drawn from reason and experience), yet they fail to see the true spiritual significance of what they study. In other words, they do not comprehend the spiritual realities to which the physical realm bears witness, making secular scientists often wrong when they try to construct a worldview based on science.

### **Question Three: How Far Does Science Reach?**

Scientists have a tremendous amount of prestige and authority in Western culture. But what is it, if anything, that makes science unique from other types of knowledge? By what criterion does one distinguish science from pseudoscience? These questions address what philosophers call the demarcation problem. The most common way to locate the essence of science has been to connect it to a theory of scientific method. One can have confidence that scientific knowledge is progressing towards truth because it is guided by a unique set of procedures for generating or evaluating knowledge. But four hundred years after the Scientific Revolution, there is no consensus about the nature of science or its methods, and there likely never will be one. There is not a single method that underlies all the different things scientists do, rather methods

20. Saint Augustine, *On Genesis: A Refutation of the Manichees, Unfinished Literal Commentary on Genesis, The Literal Meaning of Genesis* (Hyde Park, NY: New City, 2004), 186.



change from discipline to discipline, or even theory to theory.<sup>21</sup> What makes science “science” is not itself a scientific question, which is why most natural scientists do not waste time trying to answer it.

But it is nevertheless valuable for Christians to reflect on the nature of science, thinking especially about how much of the world is describable in scientific terms. This is what is meant by the question: “How far can science reach?” Instead of attempting to give a strict definition of science, I will identify two styles of doing science—rationalist and empiricist—that have different ambitions with respect to the scope of scientific theories.<sup>22</sup> Both styles are evident in modern science, even though they cannot be reconciled. And each has differing implications for the relationship of Christianity and science.

I take these styles from the work of Francis Bacon (1561-1626) and Rene Descartes (1596-1650), who were among the earliest advocates of new strategies for gaining knowledge of nature and were frequently celebrated by proponents of the Scientific Revolution. Contemporary accounts of scientific methodology often take as a starting point the work of the “two greatest philosophers of the scientific revolution.”<sup>23</sup>

Following Descartes, rationalist science has three distinctive characteristics. First, the goal of science is to provide a worldview. Placed in his historical context, Descartes was offering a cosmological system, the first complete alternative since the time of Aristotle.<sup>24</sup> Second, Descartes has confidence in the ability of reason to discern the hidden structure of reality, even if it conflicts with everyday experience. Because there is only one kind of matter underlying physical processes, phenomena were to be explained in terms of the discipline of mechanics: the shape, size, quantity, and motion of particles of matter.<sup>25</sup> Many natural philosophers found mechanistic explanations so intuitive that it became the dominant system of nature in the early modern period despite its puzzling consequences for biology—are the actions of one’s pet not, in principle, different from the action of a magnet? The third and final characteristic is that scientific explanations should be timeless, universal, and necessarily certain. If

21. Nancy Cartwright *et al.*, *Otto Neurath: Philosophy Between Science and Politics* (Cambridge: Cambridge University Press, 1996), 253.

22. Josh Reeves, “On The Relation Between Science and the Scientific Worldview,” *The Heythrop Journal* 54.4 (July 1, 2013): 554–62.

23. Gary Gutting, “Scientific Methodology,” in *A Companion to the Philosophy of Science*, ed. W. H. Newton-Smith (Oxford: Blackwell, 2000), 425.

24. Stephen Gaukroger, *The Emergence of a Scientific Culture: Science and the Shaping of Modernity, 1210-1685* (Oxford: Clarendon, 2006), 321.

25. John Henry, *The Scientific Revolution and the Origins of Modern Science*, 2nd ed. (New York: Palgrave, 2001), 69.

matter is extended in three dimensions, then Descartes believed that physics can be reduced to geometry, and thus physics can have the same deductive certainty.<sup>26</sup>

Francis Bacon helped to articulate empiricist science, which differs on all three points. First, for Bacon, the goal of science is not to give a worldview but to offer practical knowledge and “good fruits” such as technology.<sup>27</sup> Bacon went so far as to deny that there could be knowledge for its own sake, or truth that does not result in action. Second, empiricist science was suspicious of philosophical assumptions contaminating one’s observations. Instead of offering universal generalizations for what must happen, they focused on what had happened in particular cases. Members of the Royal Society embraced Bacon on this point and consequently tended to disdain large-scale theories and speculations about worldview in favor of close examinations of discrete, historical events.<sup>28</sup> Finally, knowledge claims must always be backed by empirical facts. Followers of Bacon promoted a philosophy that preferred facts over hypotheses, the former of which are adequately witnessed and theory-neutral statements of natural events, whereas the latter was conjecture, even if well-founded.<sup>29</sup>

Rationalist and empiricist styles of science differ on how much of the world can be explained from a scientific perspective. Rationalist science tends to equate knowledge with scientific knowledge and thus leads easily to scientism and atheism. For example, a rationalist might argue that those things humans find most significant in the world—such as the love of our parents or children—are “nothing but” blind chemical reactions in the brain.<sup>30</sup> They thus reject explanations for natural phenomena that do not fit with their explanatory principles, which leads them to postulate mechanistic accounts even on subjects where we still do not have a good scientific model of what is happening.

There are also many Christians who would favor an expansive view of science, even if they do not accept every aspect of rationalist science. When Christians argue that the Bible can be validated according to the exacting standards of contemporary science, they assume that science is the most rigorous form of knowledge. As the scientific creationist Henry Morris says, “‘Science’ is knowledge, and the Bible is a book of true and factual knowledge throughout, on every subject that it deals.”<sup>31</sup>

26. Margaret J. Osler, *Divine Will and the Mechanical Philosophy: Gassendi and Descartes on Contingency and Necessity in the Created World* (Cambridge: Cambridge University Press, 2004), 204.

27. Gaukroger, *Emergence of a Scientific Culture*, 164ff.

28. Perez Zagorin, “Francis Bacon’s Concept of Objectivity and the Idols of the Mind,” *British Journal for the History of Science* 34.4 (2001): 384.

29. Peter Dear, *Revolutionizing the Sciences: European Knowledge and Its Ambitions, 1500-1700*, 2nd ed. (Princeton, NJ: Princeton University Press, 2009), 62.

30. Steven Weinberg, “Without God,” *The New York Review of Books*, September 25 2008, <http://www.nybooks.com/articles/2008/09/25/without-god/>.

31. Morris and Morris III, *Many Infallible Proofs*, 238.

When Christians argue for theistic science, they are arguing for the melding together of science and Christianity into a single worldview.

For those who favor the empiricist style, the goal is not to show how theology can meet the standards of scientific evidence, but to keep science within its proper boundaries. For empiricists, science deals with reproducible phenomena, using terms and concepts that can be clearly defined. Because of this limitation, theological statements, along with most other aspects of human reasoning about the world, do not meet the standards of science. As the physicist Ian Hutchinson says, “the process of describing the world in reproducible terms appears to have limits, fundamental limits, that are built into the fabric of the universe.”<sup>32</sup> The empiricist style displays what John Polkinghorne calls “bottom up thinking.”<sup>33</sup> Bottom up thinkers try to start from experience and move from experience to understanding, even while recognizing the multi-level character of the world in human experience. In other words, there are many windows “through which we may look out onto the world of which we are inhabitants.”<sup>34</sup>

So how much of the world is describable in scientific terms? Does the word “science” extend only to those parts of reality that we can quantify or measure? Or does it refer to any belief rigorously grounded in evidence? The answer that Christians give to this question will dictate the type of connections that one attempts to build between theology and science. I myself favor the empiricist view as expressed here by the philosopher of science, Nancy Cartwright: “It is my underlying view that it is this quite reasonable demand that scientific claims be precise and unambiguous that imposes limits on how far the sciences can stretch, for not much of the world lends itself to this kind of description.”<sup>35</sup> If this is correct, then much of the science-faith discussion needs to combat overly ambitious scientific explanations, to prevent science from slipping into idolatry. As I see it, the job of Christians is not to tell scientists what they should discover in their research, but be a constant reminder of what they are not yet, and likely will never, be able to explain.

## **Conclusion**

Christians today live in an age of science. Whether we agree or not, from the perspective of an increasingly secular culture, science often represents one of the most powerful achievements of our species. If we thus are going to reach that culture for Christ, Christians need to have a balanced position about science, one that can celebrate and

32. Ian Hutchinson, *Monopolizing Knowledge* (Belmont, MA.: Fias, 2011), 39.

33. John C. Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-Up Thinker* (Princeton: Princeton University Press, 2014), 4.

34. John C. Polkinghorne and Michael Welker, *Faith in the Living God: A Dialogue* (Minneapolis, MN: Fortress, 2001), 101.

35. Nancy Cartwright, “The Limits of Causal Order, from Economics to Physics,” *Perspectives on Science* 7.3 (1999): 318.

affirm the successes of science as good gifts from God, while also resisting when it oversteps its boundaries to become a rival worldview. How can we engage science from distinctively Christian perspective without giving in to anti-intellectualism? When young Christians walk away from their faith because of science, as many polls show, was it because they were not taught strictly enough how to defend traditional beliefs about Adam or Eve or the age of the earth? Or is it because the church today is failing to accommodate itself to new evidence, making the same mistake that the Catholic Church committed against Galileo some four hundred years ago? And how can Christians without any scientific training be expected to speak with authority about the strengths or weaknesses of current scientific theories such as evolution, the big bang, the age of the earth, or climate change?

These are difficult questions that call for wisdom, humility, and discernment, traits that are easily lost in the culture wars. As a first step, at least, I hope Christians recognize the validity of the three questions addressed in this paper, and acknowledge that faithful followers of Jesus can answer them in different ways.

## ***Can Science Answer Life's Big Questions? The Error of Allowing Naturalism to Dictate our Origins Models.***

**JOHN A. BLOOM**

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**Abstract:** The modern tensions between Christianity and science stem mainly from the philosophical assumption of methodological naturalism as a filter for proper “scientific” answers, even for answers to the Big Questions regarding our origins. The pressure to conform to this secular religious view and the way naturalism skews the interpretation of scientific data may unwittingly drive some Christians to propose and defend inconsistent biblical interpretations like theistic evolution.

**Key Words:** origin of life, human origins, theistic evolution, evolutionary creation, science, methodological naturalism, intelligent design, theology, physical resurrection

### **Introduction**

As a scientist who is also a theologian, it is not unusual for someone who learns of my dual backgrounds and interests to give me a wry smile or inquisitive look and ask, “That’s odd... so how do you fit them together?”

If I have the liberty to give a long answer, I mention that I also have a background as a historian, and if you go back only a century or two, you find that almost everyone then thought that science and theology did fit together – and fit quite well, since they believed that God’s works and God’s word both had the same Author.<sup>1</sup> But perhaps most importantly, people back then did not expect science alone to answer life’s Big Questions, such as those concerning our origins and purpose. What makes any connections between Christianity and science seem “odd” today is that many people uncritically let science answer these Big Questions without seeing that methodological naturalism is a religious assumption in modern science which dictates the troublesome “scientific” answers for many Christians. As I continue my answer below, I will outline how this religious assumption in science developed, note science’s shortcomings in answering the Big Questions concerning the origin of life and of humans, and point out the failure of theistic evolution to recognize this religious problem within science and solve it.

1. Alister E. McGrath, *Science & Religion*, repr. (Oxford, UK: Blackwell, 2000), 139-42.



## Myths about Science and Theology

“Science and Christianity have always been at war with each other.” “The Bible is totally irrelevant for understanding the physical world.” These modern myths about science and theology are urban legends which serve our secular culture well as propaganda, but which historians of science repeatedly have shown to have little basis in fact.<sup>2</sup> Unfortunately, these myths got started and then become popular because early science looked like a convenient tool to use for avoiding a cosmic authority figure as the answer to life’s Big Questions.<sup>3</sup> For these early authority-avoiding advocates of science, eternal physical laws and mechanical processes became a convenient substitute for God, who had nothing to do in a world strictly governed by mathematics. Certainly the study of physical laws and mechanical processes have given us incredible knowledge, ranging from the sub-atomic to the universal; and with this knowledge, we have gained technologies which have revolutionized every dimension of our lives in health, food, energy, communication, transportation, and even entertainment. But for all of the ways which it improves our lives, science has a glaring weakness in that it ultimately cannot answer the Big Questions of life: Where did we come from? What is our purpose for being here? Where are we going?

Now anyone who watches NOVA specials or reads popular-level science magazines is well aware that science definitely claims to answer these Big Questions without mentioning God, and it is true that science offers some insight and new perspectives about them. However, the voice-over giving the “no God is necessary” answers is not science, but the philosophy which strait-jackets science today: naturalism. The myth that science and Christianity are in conflict is a disguise for the fact that the struggle is actually between Christianity and the competing religion of naturalism.<sup>4</sup>

## Naturalism in Science

Naturalism is the position that the only things which exist are natural or physical. When the systematic study of nature is subject to this constraint, any explanation which is “scientific” must appeal only to natural or physical causes.<sup>5</sup> If something non-physical acted in the world, it would be super-natural and outside the realm

2. John Hedley Brooke, *Science and Religion: Some Historical Perspectives* (Cambridge, UK: Cambridge University Press, 1991); Gary B. Ferngren, ed., *Science and Religion: A Historical Introduction*, 2nd ed. (Baltimore, MD: Johns Hopkins University Press, 2017); Ronald L. Numbers, ed., *Galileo Goes to Jail and Other Myths about Science and Religion* (Cambridge, MA: Harvard University Press, 2009).

3. Thomas Nagel, *The Last Word* (New York: Oxford University Press, 1997), 130-31.

4. See, for example, Michael Ruse’s recent *Darwinism as Religion* (New York: Oxford University Press, 2016).

5. Lui Lam, *Science Defined*, February 20, 2015, accessed April 15, 2017, <http://www.sjsu.edu/people/lui.lam/scimat/Science%20Defined-150220.pdf>.

of science. Often this approach in contemporary science is called “methodological naturalism” to distinguish itself from philosophical or atheistic naturalism, but the effects are the same. A “Divine Foot in the door” is not allowed,<sup>6</sup> and thus science must give naturalistic answers no matter what the data show, not only to everyday mechanical questions, but even to the Big Questions. Consequently, according to “science” the universe either has always existed or somehow made itself; we are just lucky evolutionary accidents who somehow just happened to appear on a grain of sand on the shores of an infinite beach of galaxies; our thoughts are merely chemical reactions and thus we have no free will; and when we die, the lights simply go out.

However, these religious answers did not come from science, but from the philosophy which today holds it captive. Looking at the same scientific data, there are many scientists (like myself) who see ourselves in a God-created and wonderfully designed and fine-tuned universe, on a beautifully crafted planet we call our home, with an obvious purpose to glorify God by studying His handiwork, and with the expectation of enjoying life with Him forever.

But beyond giving naturalistic answers to the Big Questions, (methodological) naturalism subtly has strangled the spirit of science by supplying the answers to *all* of our questions: whatever was, is, or is to come, will ultimately be explained by mechanical, physical processes: for instance, the thoughts you are having now are merely chemical reactions inside your brain. And when a naturalistic answer like this one does not seem to fit the data or feel quite right, we are assured that our doubts are a superstitious hangover and that, given enough funding and time, a more convincing naturalistic explanation will be forthcoming. Like the boring Sunday School teacher whose questions always have “Jesus” as the answer, science under naturalism’s thumb is boring because it always offers the same answer: “Naturalism.”

Of course, I am not arguing that we should not *prefer* and even *expect* mechanical causes for physical events, but (methodological) naturalism is not saying that: it asserts that ALL causes are mechanical. It is absolutely out of bounds scientifically to consider anything else, no matter how weak any current mechanical explanation might be.<sup>7</sup> For example, the strongest evidence for the existence of the multiverse being cited today is the fine-tuning of our own universe: it is too spooky to think that our own well-crafted universe could have happened only by chance, hence there must be countless other throws of the dice which happened out there somewhere and resulted in innumerable, chemically and structurally boring, lifeless universes.<sup>8</sup>

6. Richard C. Lewontin, “Billions and Billions of Demons,” *The New York Review of Books*, January 4, 1997, accessed January 30, 2000, <http://www.nybooks.com/articles/1997/01/09/billions-and-billions-of-demons/>

7. Cornelius G. Hunter, *Science’s Blind Spot: The Unseen Religion of Scientific Naturalism* (Grand Rapids, MI: Brazos, 2007).

8. See Jeffrey A. Zweerink, *Who’s Afraid of the Multiverse?* (Glendora, CA: Reasons to Believe, 2008).

## **A Better Approach: Follow the Evidence**

It is unfortunate that naturalism has become the defining feature of science today, because there are much better definitions and approaches for science. One of my favorites comes from the maverick theoretical physicist Richard Feynman, who quipped: “Science is the belief in the ignorance of experts.”<sup>9</sup> For science to make progress you have to question textbook orthodoxy and to assume that your professors and “the consensus view” are wrong. I remember my thesis advisor remarking on more than one occasion that the greatest achievements in his long career were the times when he proved that the popular views on various issues in biophysics were dead wrong.

While Feynman did not apply his definition of science to philosophical concerns, I suggest that the experts’ assumption of naturalism as the exclusive scientific approach can and should be questioned. Galileo made progress in his day by challenging the reigning and stifling Aristotelian influence on science;<sup>10</sup> I suggest that progress today can be made by allowing the philosophical spirit of science to be open to the spirit of God. As Feynman notes, a truly scientific spirit challenges consensus and the status quo. A look in the historical rear-view mirror shows that virtually all scientific progress occurred by questioning what was the then-current orthodoxy, one of which has been Aristotelian philosophy.

Christians can be vanguards in politely raising this philosophical issue in contemporary science. If we follow the evidence where it leads without presuming naturalistic answers, we might make fascinating discoveries: maybe the fine-tuning of the universe means that Someone wanted us to be here. Perhaps Someone programmed functions into non-protein-coding “junk DNA,” so we should not dismiss it as “genetic flotsam and jetsam” and claim it is strong evidence for macro-evolution.<sup>11</sup>

But it is risky to be vanguards. It could cost you your career, as we see today with those who dare to question any aspect of anthropogenic climate change.<sup>12</sup> Science is a human endeavor, after all, and has all the problems of political correctness, group think, overbearing authority figures, and urban legends. For all of its textbook claims

9. Richard P. Feynman, “What is Science,” *The Physics Teacher* 7, no. 6 (September 1969): 313-320, accessed March 12, 2014, <http://dx.doi.org/10.1119/1.2351388>.

10. See Charles E. Hummel, *The Galileo Connection: Resolving Conflicts between Science and the Bible* (Downers Grove, IL: InterVarsity, 1986).

11. David Klinghoffer, “On Junk DNA Claim, Francis Collins Walks It Back, Admitting ‘Hubris,’” *Evolution News and Views*, July 19, 2016, accessed July 20, 2016, [http://www.evolutionnews.org/2016/07/on\\_junk\\_dna\\_fra103008.html](http://www.evolutionnews.org/2016/07/on_junk_dna_fra103008.html).

12. Roger Pielke Jr., “My Unhappy Life as a Climate Heretic,” *Wall Street Journal*, December 2, 2016, accessed December 2, 2016, <http://www.wsj.com/articles/my-unhappy-life-as-a-climate-heretic-1480723518>. See also Judith Curry, “JC in transition,” *Climate Etc.*, January 3, 2017, accessed January 10, 2017, <https://judithcurry.com/2017/01/03/jc-in-transition/> and <http://www.uncommon-descent.com/intelligent-design/85127/>.

to love “open inquiry,” many scientists are extremely intolerant of dissent.<sup>13</sup> This is why humility and the willingness to say, “You know, I could be wrong,” are such virtues. Nevertheless, as much as we are able, it is important to ask probing questions, since this might steer the ship a little in the right direction. For example, Michael Behe’s much maligned work on irreducible complexity in *Darwin’s Black Box*<sup>14</sup> did lead one researcher to admit recently:

“Since the subject of cellular emergence of life is unusually complicated (we avoid the term ‘complex’ because of its association with ‘biocomplexity’ or ‘irreducible complexity’), it is unlikely that any overall theory of life’s nature, emergence, and evolution can be fully formulated, quantified, and experimentally investigated.”<sup>15</sup>

This brings us to one of the Big Questions where naturalism is falling on hard times: the origin of life. As the quotation above acknowledges, the explosion of scientific understanding in how life works reveals an “unusually complicated” biochemistry, filled with chicken-and-egg problems and such elegant fine-tuning that living cells make the rest of the universe seem trivial in comparison.<sup>16</sup> Yet, even though we may never fully formulate, quantify and experimentally investigate life (all of the things which science is good at), we are still assured that life arose by some naturalistic process. It is striking how this religious voice still manages to speak despite the growing mountain of knowledge which shouts otherwise.

### **Does Theistic Evolution Work?**

Since we are on the topic of biology, it is worth discussing this Big Question as well: How did we humans get here? And what about all the evidence for evolution? When beginning any discussion of evolution, it is important to distinguish between micro- (small changes) and macro- (large changes) evolution. As Michael Behe notes

13. This is a sociological fact about the scientific community and is typical of many groups. Thus sociology often explains “consensus science” instead of strong and clear scientific data. When citizens or non-specialists observe that the “consensus” in a discipline is being strictly enforced and used for political purposes, they need to be especially cautious about what that consensus asserts: it likely is not true. For example, the knee-jerk rejection of Intelligent Design and the wholesale acceptance of naturalistic evolution by most university scientists are driven by strong sociological factors, which in turn influences many Christian university scientists to accept theistic evolution. Note that Lewontin voices similar sociological concerns in “Billions,” op. cit..

14. Michael J. Behe, *Darwin’s Black Box: The Biochemical Challenge to Evolution*, 2nd ed. (New York: Free, 2006).

15. Jan Spitzer, “Emergence of Life on Earth: A Physicochemical Jigsaw Puzzle,” *Journal of Molecular Evolution* 84 no. 1 (January 2017): 1-7, accessed April 5, 2017, <http://dx.doi.org/10.1007/s00239-016-9775-3>.

16. Stephen C. Meyer, *Signature in the Cell: DNA and the Evidence for Intelligent Design* (New York: HarperOne, 2010); Fazale Rana, *The Cell’s Design: How Chemistry Reveals the Creator’s Artistry* (Grand Rapids, MI: Baker, 2008); Fazale Rana and Hugh Ross, *Origins of Life: Biblical and Evolutionary Models Face Off* (Colorado Springs, CO: NavPress, 2004).

in *The Edge of Evolution*, small changes can be easily documented and studied, but extrapolating this process to explain the origin of large changes is problematic because the required modifications are extensive and coordinated, something which the neo-Darwinian mechanism of random mutation seems incapable of doing.<sup>17</sup>

But there is a philosophical problem with macro-evolution too. Naturalism requires it to be a completely unguided process: it cannot look ahead, anticipate, or plan a path towards any goal. Macro-evolution says that somehow the static on my radio can turn into Beethoven's Fifth Symphony, without the need for Beethoven. While "natural selection" (environmental feedback) still appears in textbooks as the filter for turning genetic static into birds and people, evolutionary biologists now realize that most environmental influences are so weak and undirected that they do not go anywhere. Thus the "neutral theory of evolution" (non-adaptation-driven) is now the buzzword.<sup>18</sup> In other words, since it has become clear that filtering static will not turn it into great music, today we are assured that *unfiltered* static will turn into Beethoven's Fifth, given enough time. If naturalism were not holding the spirit of science captive, would such a mechanism be seriously considered?

Given these problems with macro-evolution, why are many Christians in the biological sciences "theistic evolutionists"?<sup>19</sup> Why do they see this undirected, unguided macro-evolution as the mechanism which God used to make us? Some scientists I have met became Christians later in life, and probably have not taken the time to think through the ways in which naturalism still deeply influences their scientific and theological views.<sup>20</sup> Others maintain a dissonance by saying that God somehow guides what happened through evolutionary processes in a way which science cannot see, perhaps not recognizing that Darwin's main goal in formulating his theory was to completely remove God from the process.<sup>21</sup> Still others were raised

17. Michael J. Behe, *The Edge of Evolution: The Search for the Limits of Darwinism* (New York: Free, 2007).

18. Laurent Duret, "Neutral theory: The null hypothesis of molecular evolution." *Nature Education* 1 no. 1 (January 2008): 218, accessed March 15, 2017, <http://www.nature.com/scitable/topicpage/neutral-theory-the-null-hypothesis-of-molecular-839>.

19. The term "theistic evolution" or "evolutionary creation" is difficult to define, given the range of positions found among the spokespersons who use these terms. One of the best and most objective presentations of this and the full range of creation/evolution views is Gerald Rau, *Mapping the Origins Debate: Six Models for the Beginning of Everything* (Downers Grove, IL: InterVarsity, 2012). For our purposes here, the common thread among theistic evolutionists is their belief that humans had non-human ancestors. See Wayne Grudem, *Systematic Theology* (Grand Rapids, MI: Zondervan, 1994), 275-79; Millard J. Erickson, *Christian Theology*, 2nd ed. (Grand Rapids, MI: Baker, 1998), 504-7; Norman L. Geisler, *Baker Encyclopedia of Christian Apologetics* (Grand Rapids, MI: Baker, 1999), 233-34, s.v. "Evolution, Theistic."

20. Unfortunately, I believe that Francis Collins, a great scientist, Christian, and author of *The Language of God* (New York: Free, 2007), falls in this category.

21. Historically, the American Botanist Asa Gray corresponded with Darwin over this point, and Darwin eventually rebuffed Gray for his theistic interpretation. See Janet Browne, "Asa Gray and Charles Darwin: Corresponding Naturalists," *Harvard Papers in Botany* 15 no. 2 (December 2010): 209-20, accessed June 7, 2017, <https://doi.org/10.3100/025.015.0204>.

as young-earth creationists, but totally converted over to the Darwinist side after they felt betrayed by the weaknesses of some young-earth arguments. Now, after seeing the popularity and elegance of Darwinist logic, they are unwilling to consider any creation-friendly positions.<sup>22</sup>

Since we are human, it is possible to be blinded by clever arguments and not see their weaknesses, especially when they are the main stream, well-funded, and peer-supported “consensus view.” One example of such a brilliant but poor argument is macro-evolutionary theory’s assumption that physical and/or genetic similarity is an absolute proof of common descent. Of course, the kittens in a litter sleeping by a female cat are likely her descendants, but when we start making historical arguments about ancient animals based on fossil or genetic data where the supposed intermediates are unknown extrapolations, we need to pause and realize that now we are doing forensics, and we cannot have the same level of certainty as we have with the kittens. As a historian, I have found many cases where looks are deceiving, and the real situation was far more complex than the surviving artifacts imply.<sup>23</sup> But if one is locked into naturalism, then common descent is the only possible physical mechanism to explain similarity, and the many anomalies and exceptions to this are ignored or become “research problems” to discuss in upper level biology courses on convergent evolution,<sup>24</sup> after all of the students are converted to Darwinism in the freshman biology class. A broader worldview perspective is open to agent causation and would take the exceptions seriously.<sup>25</sup>

Nowhere does the influence of naturalism in science get more personal than with the topic of human origins. By presuming naturalism when being “scientific,” it is a foregone conclusion that humans have common ancestry with other primates and evolved their modern abilities gradually over eons. No fossils or other data are required to affirm this position: the religion of naturalism dictates the correct answer to science. The story about an independently and specially created first human couple, having communion with God in an idyllic setting before they rebelled against Him, must then be a myth.

22. This position is well exemplified by Karl W. Giberson, *Saving Darwin: How to Be a Christian and Believe in Evolution* (New York: HarperOne, 2008).

23. One example is the existence of two cities called Jericho in New Testament times (relatively recent history), which explains how Jesus healed Bartimaeus when he was both leaving (Mark 10:46) and entering (Luke 18:35) “Jericho.” See *NIV Archaeological Study Bible* (Grand Rapids, MI: Zondervan, 2005), 1646.

24. See Tom Bethell, “The Conundrum of Convergence,” in *Darwin’s House of Cards* (Seattle, WA: Discovery Institute, 2017), 115-25.

25. Cornelius Hunter, “Sugar Gliders, Flying Squirrels, and How Evolutionists Explain Away Uncooperative Data,” *Evolution News and Views*, January 25, 2017, accessed January 25, 2017, [http://www.evolutionnews.org/2017/01/sugar\\_gliders\\_fl03440.html](http://www.evolutionnews.org/2017/01/sugar_gliders_fl03440.html).



### **Suggestive Contrary Evidence**

Yet a little scratching around in the data regarding human origins offers some suggestive clues that we indeed did have a unique start compared to the animals. For one, humans do not have some families of viruses which are commonplace in primates, yet these viruses can infect us today if we happen to have close contact with primates. But if we are related to primates via common descent, it is strange that we did not carry these ancient viruses along with us as we evolved apart, like they did.<sup>26</sup> Also, genetic studies on mitochondria, which are passed along in the cytoplasm of a mother's egg to her children's cells, converge back to a single female "Mitochondrial Eve" about 150,000 years ago, much more recently than a standard common descent model would expect. Similarly, the male Y-chromosome, which fathers pass on only to their sons, shows a convergence back to a single male "Adam" at about this same time.<sup>27</sup> For the naturalist, these data pose research problems but do not lead anyone to question the core assumption of universal common descent; for those with a wider philosophical toolkit available, these data are suggestive of a unique origin for humans.

But what about all of the other evidence for human evolution – the hominid fossils, for example? Fossil data do not give us a historical lineage or prove ancestry: a philosophical assumption is what bridges together and links the fossils. It is possible that God specially created Adam 'from scratch' out of the dust of the ground, yet he looked similar to the other life forms which God created previously. God is not required to reinvent the wheel and to create new life which is totally distinct from what He created before, any more than we demand that every time an artist makes a new painting, it must be radically different from all of his previous work. Similarity alone does not prove descent. Personally, I keep being reminded of this every few weeks because a fellow who attends my very large church looks almost identical to me, yet we have no known "common ancestor" in our family histories. His friends and my friends easily mistake one of us for the other, but fortunately our wives can tell us apart!

### **A Biblical Problem for Theistic Evolution**

Wanting to follow the naturalistic assumption approach in science and require mechanical explanations for everything, the theistic evolutionist goes with common descent and regards Genesis as figurative. However, I think there is a serious problem in adopting this naturalistic approach to the origin of Adam if we look more broadly

26. Ann Gauger, "A Puzzle about Human Uniqueness," *Biologic Institute*, April 21, 2012, accessed April 22, 2012, <http://www.biologicinstitute.org/post/21513285720/a-puzzle-about-human-uniqueness>.

27. Fazale Rana with Hugh Ross, *Who was Adam? A Creation Model Approach to the Origin of Humanity*, 2nd ed. (Covina, CA: RTB, 2015).

at Bible history. According to numerous Old and New Testament passages, human history will culminate with the physical resurrection of every person who has lived on earth, both the righteous and the unrighteous (Dan 12:2, Isa 26:19). The Great White Throne Judgment follows this resurrection (Rev 20:11-5). How is God physically going to re-create the billions of people who have lived on the earth, most of whose bodies have completely decayed away to dust (Gen 3:19)? Will God do this through some gradual evolutionary process, or suddenly? The answer is clear: we are told in 1 Corinthians 15:52 that God will raise the dead “in the blink of an eye.” Since these passages refer to people “sleeping in the dust of the earth,” it is reasonable to suppose that God will quickly re-create them from the dust of the earth.<sup>28</sup> Here is my point: If we believe that someday God will physically and suddenly – at the Last Trumpet – re-embody the spirits of billions of people on the Last Day, what is the problem with believing that God suddenly created the physical body of the First Man from the dust of the earth and ensouled him? If God has the power to resurrect billions, He does not need evolution to create Adam.

Of course, knowing exactly what happened in the distant past is extremely difficult. Ancient history suffers from a severe lack of data, and it certainly does not enjoy the convenience of repeatability which empowers good lab science. But a lack of data is too-easily bridged by philosophical assumptions, and the data which contradict a favored philosophical assumption are easy to overlook. As in forensics, where a lack of data is too-easily bridged by bias and a favored suspicion of guilt, I fear that the theistic evolutionist is “going with the flow” of naturalism instead of resisting the presumption that Adam had ancestors and thus keeping more biblical hypotheses about human origins on the table. Is it scientifically crazy to think that God made the first humans in a special and distinct way? Not if one takes data like viral isolation, Mitochondrial Eve and Y-chromosome Adam as more than research problems and recognizes that the assumption of common ancestry with other primates is just that: a naturalistic assumption predicated on the belief that God never acts in the physical world (if He exists at all).

## **Conclusion**

In summary, the Big Questions of life remain firmly within the religious domain, and unfortunately science today is committed to providing answers consistent with its naturalistic religious presupposition. Once a Christian realizes this, it is very liberating to see that a disguised religious position is interpreting the data and driving the “scientific” conclusions, and that a fair-minded look at the data clearly point to a Creator as the best answer. Instead of caving in to an alternative religious position

28. The alternatives are that the resurrection is an *ex nihilo* creation rather than from pre-existing matter, which is not a problem for this argument, or that the resurrection is only a “spiritual” resurrection, which the church condemned centuries ago as the heresy of Gnosticism.

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in order to be called “scientists,” I suggest that Christians in the sciences work like Galileo to free the spirit of science from its enslavement to philosophies like naturalism or Aristotelianism and infuse it appropriately with the spirit of God. If God’s works are free to speak for themselves, they indeed will declare His glory.

## ***Christian Theology of Creation and the Metaphysical Foundations of Science***

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**Abstract:** Recent scholarship within the history and philosophy of science has shown that in both the past and the present, specifically Judeo-Christian theological assumptions about the value, the intelligibility, the regularity, and the character of the cosmos have provided foundational assumptions for certain key scientists and scientific discoveries. This article investigates the nature of the interaction between science and Christian theology by exploring the role that metaphysical presuppositions and theological concepts have played—and continue to play—within the scientific process. I will examine the role of Christian theological thought within both the general philosophical presuppositions that undergird the whole scientific enterprise and within particular presuppositions that were present during pivotal episodes of scientific discovery. I will show how Christian theology has both implicitly and explicitly influenced (and still influences) the ethical values, aesthetic principles, philosophical commitments, metaphysical presuppositions, and motivations underlying the modern scientific project. Because such non-empirical shaping principles are a key part of what science *is*, science really does need faith.

**Keywords:** Metaphysical Presuppositions of Science, Role of theology in science, intelligibility of cosmos, contingency of cosmos, values in science, Ockham's Razor

Beginning in the late twentieth century, philosophers and historians of science have increasingly discovered that the practice of science cannot be neatly separated from its social and cultural context. Historians of science have identified that a key dimension of the social context of science are numerous “ways in which religious beliefs have influenced science.”<sup>1</sup> These ways include “presuppositions underwriting science . . . sanctions and motives for doing science . . . principles for regulating scientific methodology and for selecting acceptable theories,” and so on.<sup>2</sup> Moreover, recent

1. John Hedley Brooke, *Science and Religion: Some Historical Perspectives* (Cambridge: Cambridge University Press, 1991), 18-33

2. Edward B. Davis, “Christianity and Early Modern Science: The Foster Thesis Reconsidered,” in *Evangelicals and Science in Historical Perspective*, eds. David N. Livingstone, D.G. Hart, and Mark A. Noll (Oxford: Oxford University Press, 1999), 77.

scholarship within the history and philosophy of science has shown that in both the past and the present, specifically Judeo-Christian theological assumptions about the value, the intelligibility, the regularity, and the character of the cosmos have provided “foundational assumptions for certain key scientists and scientific discoveries.”<sup>3</sup> Scholars in this area have found that Christian theological beliefs have had “both internal and external influences on the development of science.”<sup>4</sup> In this article I will explore the nature of the interaction of science and theology by investigating the role that metaphysical presuppositions and Christian theological concepts play within the scientific process.<sup>5</sup> I will show how Christian understandings of creation have provided a conceptual and theoretical foundation for values and shaping principles within science, for general philosophical presuppositions that undergird the whole scientific enterprise, and for numerous particular presuppositions that were present during pivotal episodes of scientific discovery.

## The General Presuppositions of Science

The scientific enterprise is founded upon a number of *general presuppositions* about the nature of reality. These presuppositions are non-empirical philosophical beliefs about things such as the orderliness and regularity of reality, the ontological *objectivity* of reality, the intelligibility and contingency of existent structures and entities, the agential passivity of non-conscious nature, the unity and uniformity of the physical universe, and so on. These presuppositions are *general* in that they necessarily precede and underpin *all* scientific experimentation and reasoning. And these general presuppositions are *a priori* “conditions that are necessary for the possibility of scientific activity as such, although they can be ignored by particular scientists.”<sup>6</sup> As *preconditions* they are absolutely required for science to take place and are not open to experimental confirmation or falsification by scientific experimentation. The nature of these general presuppositions is such that “for science to develop, these beliefs must be held, at least implicitly, by society as a whole and by scientists themselves.”<sup>7</sup>

3. Alan G. Padgett, “Science and Theology,” in *The Encyclopedia of Christianity*, vol. 4, ed. Erwin Fahlbusch, et al. (Grand Rapids: Eerdmans/Brill, 2005), 873.

4. Peter E. Hodgson, *Theology and Modern Physics* (Burlington, VT: Ashgate, 2005), 16. See also Peter E. Hodgson, “Presuppositions and Limits of Science,” in *The Structure and Development of Science*, eds. G. Radnitzky and G. Andersson (Dordrecht: Reidel, 1979), 133-46.

5. Following Stephen J. Wykstra who says, “Our vision of the nature of science needs to be broadened if we are to account for the roles that metaphysical and religious believing play within the scientific process.” Stephen J. Wykstra, “Religious Beliefs, Metaphysical Beliefs, and Historiography of Science,” *Osiris*, Vol. 16, *Science in Theistic Contexts: Cognitive Dimensions* (Chicago: University of Chicago Press, 2001), 29-46, 29.

6. Mariano Artigas, “Three Levels of Interaction Between Science and Philosophy,” in *Intelligibility in Science*, ed. C. Dilworth (Amsterdam: Rodopi, 1992), 123.

7. Hodgson, *Theology and Modern Physics*, 16. See also Peter E. Hodgson, “Presuppositions and Limits of Science,” 133-46.

## **Aesthetic, Epistemic, and Moral Values That Shape Science**

### **1. The Aesthetic Value of Simplicity**

The belief that simple theories are better than more complex theories is a foundational aesthetic value that guides the practice of science and it is one of the most important philosophical assumptions undergirding the belief in the explanatory power of scientific reductionism. The idea of explanatory simplicity was first introduced by Aristotle (384-322 BCE) as a principle of parsimony which affirms that the simplest explanation for a given phenomenon is the one that will most likely be true. Aristotle states this notion as a fundamental assumption. He says, “We may assume the superiority *ceteris paribus* of the demonstration which derives from fewer postulates or hypotheses.”<sup>8</sup> One should thus favor simpler theories and explanations over those that are more complex. Over a thousand years later, we find this philosophical principle affirmed in the theology of Thomas Aquinas (1225-1274): “If a thing can be done adequately by means of one, it is superfluous to do it by means of several; for we observe that nature does not employ two instruments where one suffices.”<sup>9</sup> This approach to logic came to be called “Ockham’s Razor,” after the logician and Franciscan friar William of Ockham (1287-1347) who taught that explanatory entities should not be multiplied beyond necessity.

Emerging as a crucial logical axiom in the Christian theology of the Middle Ages Ockham’s Razor was an important guiding principle in shaping the foundation of early modern science. When Galileo compares the “Two Chief World Systems” that explain the motions of the planets (which at the time would have been that of Copernicus and that of Tycho Brahe) he assumes that there can be only *one* model of the solar system that is correct. This is because, Galileo explains, “Nature does not multiply things unnecessarily; that she makes use of the easiest and simplest means for producing her effects; that she does nothing in vain, and the like.”<sup>10</sup> Later in the seventeenth century the well-known physicist Isaac Newton (1643-1727) includes Ockham’s Razor as one of his three “rules of reasoning in philosophy” in his *Principia Mathematica*: “Rule I: We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances.”<sup>11</sup> Writing a few generations after Newton, the chemist Antoine Lavoisier (1743-1794) affirms that “It is, after all, a principle of logic not to multiply entities unnecessarily,” and he applies this principle dutifully in his practice of science as he argues against hypothetical substances, such as phlogiston, as gratuitous suppositions. “If all of chemistry can be

8. Aristotle, *Posterior Analytics*, trans. Richard McKeon (Oxford: Clarendon Press, 1963), 150.

9. Thomas Aquinas, *Basic Writings of St. Thomas Aquinas*, trans. A. C. Pegis (New York: Random House 1945), 129.

10. Galileo Galilei, *Dialogue Concerning the Two Chief World Systems*, trans. Stillman Drake (Berkeley: University of California Press, 1962), 397.

11. Isaac Newton, *Principia Mathematica* (London, 1687), 41:1.



explained in a satisfactory manner without the help of phlogiston,” says Lavoisier, “that is enough to render it infinitely likely that the principle does not exist, that it is a hypothetical substance, a gratuitous supposition.”<sup>12</sup> Writing more than 200 years later, Albert Einstein, agrees: “The grand aim of all science . . . is to cover the greatest possible number of empirical facts by logical deductions from the smallest possible number of hypotheses or axioms.”<sup>13</sup>

Today the philosophical centrality of Ockham’s Razor remains and “many scientists believe that simplicity is a crucial element in their quest for knowledge.”<sup>14</sup> The vast majority of current practicing scientists believe that, all things being equal, simpler theories are better.<sup>15</sup> Philosopher of biology Elliot Sober explains that “scientists . . . frequently appeal to parsimony to justify their choice of hypotheses” and that “removing the principle of parsimony from the organon of scientific method threatens to deprive science of its results”<sup>16</sup>

But why should scientists favor simpler theories over more complex ones? There is no *simple* answer to this question. “A problem with Occam’s razor is that nearly everybody seems to accept it, but few are able to define its exact meaning and to make it operational in a non-arbitrary way.”<sup>17</sup> There is no obvious logical or empirical connection between plausibility and parsimony. As philosopher of science Ernan McMullin says, “Efforts to express a criterion of ‘simplicity’ in purely formal terms continue to be made, but have not been especially successful.”<sup>18</sup> Although the connection between simplicity and truth is taken for granted by many practicing scientists, “There is no reason—in the absence of *independent* belief in the simplicity of nature,” says philosopher of science James McAllister, “why that policy should result in hypotheses that are true more often than would any other.”<sup>19</sup> Sober points out that it is “only because of a set of *background assumptions*” that parsimony is allowed to connect with plausibility within a particular research problem. However, says Sober, “what makes parsimony reasonable in one context...may have nothing

12. Antoine-Laurent de Lavoisier, “Réflexions sur le Phlogistique,” in *Oeuvres: Volume 2* (Paris: Imprimerie Impériale, 1862), 623-24.

13. Albert Einstein, quoted in Leonard Kollender Nash, *The Nature of the Natural Sciences* (Boston: Little, Brown, 1963), 173.

14. Hugo A. Keuzenkamp, Michael McAleer, and Arnold Zellner, “The enigma of simplicity,” in *Simplicity, Inference and Modelling: Keeping it Sophisticatedly Simple*, eds. Arnold Zellner, Hugo A. Keuzenkamp and Michael McAleer (Cambridge: Cambridge University Press, 2004), 1.

15. Alan Baker, “Simplicity,” *The Stanford Encyclopedia of Philosophy* (Fall 2013), ed. Edward N. Zalta, <https://plato.stanford.edu/archives/fall2013/entries/simplicity/>.

16. Elliott Sober, *From a Biological Point of View: Essays in Evolutionary Philosophy* (New York: Cambridge University Press, 1994), 140.

17. Hugo Keuzenkamp, Michael McAleer, and Arnold Zellner, “The enigma of simplicity,” in *Simplicity, Inference and Modelling: Keeping it Sophisticatedly Simple*, eds. Hugo Keuzenkamp, Michael McAleer and. Arnold Zellner (Cambridge: Cambridge University Press, 2001), 1.

18. Ernan McMullin, “Values in Science,” *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association* 2 (1982), 3-28, 16.

19. James W. Mcallister, “Truth and beauty in scientific reason,” *Synthese* 78 (1989): 25-51, 32.

in common with why it matters in another. The philosopher's mistake is to think that there is a single global principle that spans diverse scientific subject matters."<sup>20</sup> In the end, it would seem that Ockham's Razor is essentially an *aesthetic* value. Yet, *as* an *aesthetic* value it has played and continues to play a vital role in scientific explanation and theory choice.

## **2. The Aesthetic Value of Beauty**

Another example of an aesthetic value within science is *beauty* itself. For the working scientist "beauty is thought (and felt) to lie in explaining much with little, and in finding pattern, especially simple pattern, in the midst of apparent complexity and disorder."<sup>21</sup> Within the physical sciences beauty is often held as a guide to truth. According to McAllister, "the history of science teems with instances in which indicators of beauty appear to have prevailed over empirical criteria in directing theory-formulation."<sup>22</sup> And in physics today, the appeal to beauty remains as central aspect of research motivation and theory choice. Most of the great innovators in contemporary physics and cosmology have been "strongly attracted by intellectual beauty and have combined this with faith that beauty will point the path to comprehension."<sup>23</sup> Historian of Science Thomas Kuhn points out that such mathematical beauty was so central to the Copernican astronomer Johannes Kepler that his "entire astronomical program is based in a metaphysical faith in mathematically expressed harmonies in nature."<sup>24</sup> A few centuries later, Einstein affirms that for physicists "the only physical theories that we are willing to accept are the beautiful ones."<sup>25</sup> Indeed, Einstein was resolutely skeptical of certain aspects of quantum physics because these parts of the theory were, in his assessment, not beautiful enough to be true. For instance, his "rejection of indeterminism was essentially aesthetic: for him the harmony of the universe would be marred if, to use his own metaphor, God cast dice."<sup>26</sup> Nobel Prize

20. Sober, *From a Biological Point of View*, 140.

21. Herbert A. Simon, "Science seeks parsimony, not simplicity: searching for pattern in phenomena," in *Simplicity, Inference and Modelling: Keeping it Sophisticatedly Simple*, eds. Arnold Zellner, Hugo A. Keuzenkamp and Michael McAleer, (Cambridge: Cambridge University Press, 2004), 33.

22. James W. Mcallister, "Truth and beauty in scientific reason," *Synthese* 78 (1989): 25-51, 29. "In the history of science there exist many instances of theory-choice which cannot be explained without reference to these aesthetic criteria" (McAllister, "Truth and beauty in scientific reason," 31).

23. Harold Osborne, "Mathematical Beauty and Physical Science," *British Journal of Aesthetics* 24 (1984): 291-300, 291; "Historically, this faith was actually vindicated to a great extent in the works of these scientists. Theories which they created on what were considered primarily aesthetic grounds were later confirmed experimentally." Gideon Engler, "Aesthetics in Science and in Art," *British Journal of Aesthetics* 30 (1990): 24-34, 24.

24. Roger Trigg, *Rationality and Science: Can Science Explain Everything?* (Oxford: Blackwell, 1993), 224.

25. Albert Einstein, quoted in Graham Farmelo, *It Must be Beautiful: Great Equations of Modern Science* (London: Granta Books, 2002), xii.

26. Mcallister, "Truth and beauty in scientific reason," 36.

winning atomic physicist Paul Dirac became convinced of the truth of Einstein's General Theory of Relativity primarily because of the beauty of the theory: "One has a great confidence in the theory arising from its great beauty, quite independent of its detailed successes. . . . One has an overpowering belief that its foundations must be correct quite in dependent of its agreement with observation."<sup>27</sup>

Despite Einstein's resistance to embrace indeterminism, the founders of quantum physics were seeking beauty in their theorizing and others saw beauty in quantum theory. One of the founders of quantum theory, Werner Heisenberg, once commented to Einstein: "I frankly admit that I am strongly attracted by the simplicity and beauty of the mathematical schemes which nature presents us."<sup>28</sup> Reflecting on Erwin Schrodinger's wave equation describing quantum phenomena, Dirac said: "It seems that if one is working from the point of view of getting beauty in one's equations, one is on a sure line of progress."<sup>29</sup> This is because, explains Dirac, "Schrodinger got this equation by pure thought, looking for some beautiful generalization of De Broglie's ideas, and not by keeping close to the experimental development of the subject in the way Heisenberg did."<sup>30</sup> Dirac even goes so far as to say that if one wishes to discover truth in physics, "it is more important to have beauty in one's equations than to have them fit experiment."<sup>31</sup>

The idea that beauty is a guide to truth remains important among current physicists as well.<sup>32</sup> Contemporary physical science "is infused with a powerful element of aesthetic faith. . . . It is a faith that aesthetically good theory will be confirmed by fact and experience because the universe itself is aesthetically structured."<sup>33</sup> For example, the physicist Steven Weinberg has recently reflected, "It is precisely in the application of pure mathematics to physics that the effectiveness of aesthetic judgments is most amazing. . . . Mathematical structures that confessedly are developed by mathematicians because they seek a sort of beauty are often found later to be extraordinarily valuable by physicists."<sup>34</sup> Weinberg explains that "time and

27. James W. Mcallister, "Is Beauty a Sign of Truth in Scientific Theories?" *American Scientist* 86 (1998): 174-183, 174.

28. Werner Heisenberg, "Letter to Albert Einstein," in Ian Stewart, *Why Beauty is Truth: A History of Symmetry* (New York: Basic Books, 2008), 278.

29. Paul Dirac, "The Evolution of the Physicist's Picture of Nature," *Scientific American* 208:5 (1963): 45-53, 47.

30. Quoted in Mcallister, "Truth and beauty in scientific reason," 30.

31. Dirac, "The Evolution of the Physicist's Picture of Nature," 47.

32. Beauty is also important for non-physicists. James D. Watson reports that, when Rosalind Franklin learned of his and Francis Crick's model of the structure of DNA, she "accepted the fact that the structure was too pretty not to be true." J. D. Watson, *The Double Helix: A Personal Account of the Discovery of the Structure of DNA*, ed. G. S. Stent (London: Weidenfeld and Nicolson, 1968), 210; Evolutionary biologist Sean Carroll says "beauty, in science, is much more than skin-deep." Sean B. Carroll, *Endless Forms Most Beautiful: The New Science of Evo Devo* (New York: W. W. Norton & Company, 2006), 13.

33. Osborne, "Mathematical Beauty and Physical Science," 293.

34. Steven Weinberg, *Dreams of a Final Theory* (New York: Pantheon Books, 1992), 153.

again physicists have been guided by their sense of beauty not only in developing new theories but even in judging the validity of physical theories once they are developed. It seems that we are learning how to anticipate the beauty of nature at its most fundamental level. Nothing could be more encouraging than we are actually moving toward the discovery of nature's final laws."<sup>35</sup> The appeal to beauty is particularly prevalent among contemporary advocates of String Theory—a physical theory that is mathematically elegant but may never be empirically testable. Describing the early formulation of String Theory, John Schwarz reflects, "We felt strongly that string theory was too beautiful a mathematical structure to be completely irrelevant to nature."<sup>36</sup> Nobel Laureate and string theorist David Gross similarly remarks that "string theory could not be wrong because its beautiful mathematics could not be accidental."<sup>37</sup> Mathematical and theoretical physicist Edward Witten believes that string theory must be true because of "its wonder, its incredible consistency, remarkable elegance and beauty."<sup>38</sup>

But why should physicists assume that beauty points to truth? Although "much tribute has been paid" to the nature of beauty in the sciences, comments philosopher of aesthetics Harold Osborne, a "systematic analysis has not been attempted but . . . it is taken for granted that anyone with a talent for scientific matters will recognize a beautiful theory when he sees it."<sup>39</sup> There is no purely empirical reason or justification for affirming this aesthetic criterion and, as Nobel laureate Eugene Wigner remarks, the reason for the effectiveness of mathematical beauty in physics "is something bordering on the mysterious and there is no rational explanation for it."<sup>40</sup> While some are comfortable seeing the role of beauty within science as a mystery, others have asserted an explicitly *theological* justification for why physicists focus on beauty. Heisenberg says that expressions of beauty such as the "miracle of symmetry," harmony, and "the beauty of simplicity" reveal the "inner truth" of physical reality because they are reflections of "the original archetype of creation."<sup>41</sup> Dirac similarly affirms a divine origin for such beauty: "God used beautiful mathematics in creating

35. Ibid., 90.

36. John Schwarz, "Superstring-A Brief History," in *History of Original Ideas and Basic Discoveries in Particle Physics*, eds. H. Newman and T. Ypsilantis (New York: Plenum Press, 1996), 695-706, 698.

37. Leonard Susskind, "Quark Confinement," *The Rise of the Standard Model: Particle physics in the 1960s and 1970s*, eds. Lillian Hoddeson, L. Brown, M. Riordan, and M. Dresden (Cambridge: Cambridge University Press, 1997), 233-43, 235.

38. John Horgan, "Physics Titan Edward Witten Still Thinks String Theory Is 'On the Right Track,'" *Scientific American* (September 29, 2014), <https://blogs.scientificamerican.com/cross-check/physics-titan-still-thinks-string-theory-is-on-the-right-track/>.

39. Osborne, "Mathematical Beauty and Physical Science," 292.

40. Eugene Wigner, "The Unreasonable Effectiveness of Mathematics in the Natural Sciences," *Communications in Pure and Applied Mathematics* 13:1 (February 1960): 1-14.

41. Engler, "Aesthetics in Science and in Art," 25.

the world.”<sup>42</sup> Contemporary string theorists have likewise grounded the equating of truth and beauty within the Divine. Theoretical physicist Michio Kaku reflects that in string theory “the mind of God is music resonating through 11-dimensional hyperspace,”<sup>43</sup> and Harvard string theorist Lubos Motl comments that “Superstring/M-theory is the language in which God wrote the world.”<sup>44</sup>

### 3. Epistemic and Ethical Values

In addition to aesthetic principles, which shape both the practice and content of science, there is also a central role for epistemic and ethical values within science. Since the 1960s historians and philosophers of science have increasingly recognized that science is *value-laden*—that values are an intrinsic component within scientific theorizing and scientific practice. As *assumptions* about the worth or goodness of something, values, as such, are not empirically testable. Even though popularizers of science have continued to promote the image of science as a value-free enterprise, philosophers of science have come to recognize that “value-free science is an unattainable or untenable ideal.”<sup>45</sup>

McMullin explains that “there are certain characteristic *epistemic* values which are integral to the entire process of assessment in science.”<sup>46</sup> The desire to have a value-free science is itself an epistemic value. *Objectivity* is likewise an epistemic value. “To call a thing objective implies that it has a certain importance to us and that we approve of it.”<sup>47</sup> Another epistemic value, “namely truth itself, has always been recognized as permeating science.”<sup>48</sup> In the classic account of science, says McMullin, truth was “the goal of the entire enterprise” and in the practice of science today “truth is still a sort of horizon-concept or ideal of the scientific enterprise, even though we may not be able to assert truth in a definitive manner.”<sup>49</sup> In addition to objectivity and truth, McMullin lists the epistemic values of *unifying power* (a theory’s ability to bring together previously disparate areas of inquiry), *external consistency* (a theory’s consistency with other theories and with the general background of expectation),

42. John Polkinghorne, *The Particle Play* (New York: W. H. Freeman, 1979), 2 and 126.

43. Michio Kaku, “Interview on the Leonard Lopate Show,” WNYC (January 2, 2004).

44. Quoted by Bert Schroer, “String theory, the crisis in particle physics and the ascent of metaphoric arguments,” *International Journal of Modern Physics D Int. J. Mod. Phys. D*, 17, 2373 (14 Mar 2006): 21, <http://arxiv.org/abs/physics/0603112>.

45. Heather Douglas, “Rejecting the Ideal of Value-Free Science,” in *Value-free science?: Ideals and Illusions*, eds. Harold Kincaid, John Dupré, Alison Wylie (Oxford: Oxford University Press, 2007), 121.

46. McMullin, “Values in Science,” 6.

47. Julian Reiss and Jan Sprenger, “Scientific Objectivity,” *The Stanford Encyclopedia of Philosophy* (Summer 2016 Edition), ed. Edward N. Zalta, <https://plato.stanford.edu/archives/sum2016/entries/scientific-objectivity/>

48. McMullin, “Values in Science,” 6.

49. *Ibid.*, 7.

*internal coherence* (that there should be no logical inconsistencies and no unexplained coincidences within a theory), *fertility* (a theory's ability to make novel predictions that were not part of the set of original explananda) and predictive accuracy.<sup>50</sup>

There are also a number of moral values that guide and shape the workings of science. For instance honesty, openness, and integrity are "moral values which have always been seen as essential to the success of communal inquiry." Science is a communal enterprise that "cannot succeed unless results are honestly reported, unless every reasonable precaution be taken to avoid experimental error, unless evidence running counter to one's own view is fairly handled."<sup>51</sup> For science to make progress, scientists need to trust that the experimental results of other scientists are genuine and not falsified.<sup>52</sup> Moral principles shape science via ethical guidelines for conducting research on human and animal subjects, cultural norms and social values that determine the appropriateness of research topics (e.g., conservation biology, nuclear weapons research, genetic enhancement research), and the values of individual researchers.<sup>53</sup> Scientists' "personal beliefs may significantly influence the type of research problems that scientists may choose to work on, the approach that they use in addressing the problem, and the magnitude of effort and dedication that they invest in finding the solution to their chosen problem."<sup>54</sup> As chemist and philosopher Michael Polanyi pointed out, "Only a tiny fraction of all knowable facts are of interest to scientists, and scientific passion serves also as a guide in the assessment of what is of higher and what is of lesser interest. . . . This appreciation depends ultimately on a sense of intellectual beauty."<sup>55</sup>

The *practice* of science is likewise oriented towards outcomes that are ethically discerned and derived. The scientific endeavor to produce a vaccine is for the good of public health and for the good of humanity as a whole. The motivation behind investigating ecosystems is not typically for the sake of accumulating pure value-free

50. Ibid., 15-16; Thomas Kuhn similarly distinguished key epistemic values of the scientific enterprise such as accuracy, consistency, scope, simplicity, and fruitfulness (fecundity). See Thomas Kuhn, "Objectivity, Value Judgment, and Theory Choice," in *The Essential Tension: Selected Studies in Scientific Tradition and Change* (Chicago: University of Chicago Press, 1977), 321-22.

51. McMullin, "Values in Science," 7.

52. Hodgson, *Theology and Modern Physics*, 20. Regarding the justification of this presupposition see Meredith Wadman, "One in Three Scientists Confesses to Having Sinned," *Nature* 435, no. 7043 (June 9, 2005): 718-19. Wadman says that such "misconduct ranges from faking results outright to dropping suspect data points" (ibid.).

53. Steven Shapin and Simon Schaffer, *Leviathan and the Air Pump* (Princeton, NJ: Princeton University Press, 1985). Other types of presuppositions enter into science as well. For example philosopher Michael Stenmark explains, "Scientific knowledge presupposes introspective knowledge and knowledge based on memory, then one first must know these things to be able to do science" (Stenmark, *Scientism: Science, Ethics and Religion*, 119).

54. I. S. Caleon, G. Lopez Wui, and H.P Regaya, "Personal Beliefs as Key Drivers in Identifying and Solving Seminal Problems: Lessons from Faraday, Maxwell, Kepler and Newton," *Science Education International* 26:1 (2015): 3-23.

55. Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy* (London: Routledge, 1962), 143.



knowledge, but rather in order to support efforts to conserve such ecosystems for the sake of the animals who live in them and the humans that enjoy them. “We are interested in scientific investigations that have consequences for action.”<sup>56</sup> Science is pursued and funded according to the *relevance* of its findings in so far as they shed light on the things we most value. In this way, says Dupre, “fact and value are typically inextricably linked in the matters that concern us.”<sup>57</sup>

The process of “scientific inference is regulated by normative rules” and these rules depend on diverse values. “Scientists try to construct *good* tests of their hypotheses, they judge some explanations *good* and others *bad*, and they say that some inferences are *flawed* or *weak* and others are *strong*.” The italicized words in the previous sentence indicate “that scientists are immersed in tasks of evaluation. They impose their norms on the ideational entities they construct.”<sup>58</sup> Values enter into the process of science at a number of levels—inspiration, motivation, theory construction, and theory justification. As Kuhn explains, “The criteria of [theory] choice function not as rules, which determine choice, but as values which influence it. Two men deeply committed to the same values may nevertheless, in particular situations, make different choices, as in fact they do.”<sup>59</sup> Consequently, both epistemic and nonepistemic “values are logically needed for reasoning in science, even in the internal stages of the process.”<sup>60</sup> Moreover, the presence of values within science is not a *bad* thing. In fact, science *should* have values. As philosopher of science Heather Douglas argues, a *value-free ideal* is a *bad ideal* for science. “In many areas of science, particularly areas used to inform public policy decisions, science should not be value free. . . . In these areas of science, value-free science is neither an ideal nor an illusion. It is unacceptable science.”<sup>61</sup>

## Metaphysical Presuppositions of Science

In addition to the moral values and aesthetic principles that shape science and guide scientific discovery and theory choice, there are also general metaphysical presuppositions that serve as the deeper philosophical foundations of the entire scientific enterprise. Metaphysical presuppositions that provide the necessary conditions for science include:

56. Dupre, “Fact and Value,” 30.

57. Ibid., 35.

58. Ibid., 110.

59. Thomas Kuhn, *The Essential Tension: Selected Studies in Scientific Tradition and Change* (Chicago: University of Chicago Press, 1977), 331.

60. Douglas, “Rejecting the Ideal of Value-Free Science,” 121.

61. Ibid.

## **1. A Belief that the Physical Universe is, in Some Sense Good, and therefore Worthy of Careful Study**

This first necessary condition for the existence of science affirms that one must consider the objects and goals of science as *valuable* and *worth* pursuing before one pursues the study and practice of science.<sup>62</sup> Biologist and Nobel Laureate Konrad Lorenz expresses the goodness and worth of physical reality in the language of love, and says that he and “all of the biologists [he] know[s] are undeniably lovers of their objects of study.”<sup>63</sup> The presupposition of goodness or worth with regard to physical reality is often related to and conveyed by the appreciation aesthetic values such as awe, wonder, and beauty. Numerous scientists have thus affirmed that nature is *worth* studying because it is beautiful and because the study of nature fills one with awe. For instance, Heisenberg, reflecting on the process of scientific discovery in physics, says “What these internal relations show in all their mathematic abstraction, an incredible degree of simplicity, is a gift that we can only accept with humility. Not even Plato could have believed that it would be so beautiful.”<sup>64</sup> Physicist Richard Feynman likewise expresses the goodness or worth of investigating physical reality through invoking the aesthetic values of awe and wonder:

The same thrill, the same awe and mystery, come again and again when we look at any problem deeply enough. With more knowledge comes deeper, more wonderful mystery, luring one on to penetrate deeper still. Never concerned that the answer may prove disappointing, but with pleasure and confidence we turn over each new stone to find unimagined strangeness leading on to more wonderful questions and mysteries.<sup>65</sup>

## **2. A Belief that the World is Orderly and Rational**

If physical reality were assumed to be unstructured, disorderly, or fundamentally chaotic, science would be impossible.<sup>66</sup> The presupposition that order exists in nature is thus a necessary condition of scientific inquiry because if one did not believe that order existed at all in nature, then searching for it scientifically would be pointless.<sup>67</sup> For example, Einstein’s development of the general theory of relativity was premised on the assumption that the universe is a puzzle to be solved, and his lifelong search for a unified field theory (to unify general relativity with electromagnetism) assumed

62. Peter Hodgson, “Presuppositions and Limits of Science,” 136.

63. Marco Bersanelli Mario Gargantini, *Galileo to Gell-Mann: The Wonder that Inspired the Greatest Scientists of all Time* (Philadelphia: Templeton Press, 2009), 10.

64. *Ibid.*, 6.

65. Quoted in *ibid.*, 7.

66. Trigg, *Rationality and Science*, 224.

67. Mariano Artigas, *The Mind of the Universe: Understanding Science and Religion* (London: Templeton Foundation, 2000), 44.

that there is a deeper cosmic rationality waiting to be discovered. As physicist Paul Davies comments,

All science proceeds on the assumption that nature is ordered in a rational and intelligible way. You couldn't be a scientist if you thought the universe was a meaningless jumble of odds and ends haphazardly juxtaposed. When physicists probe to a deeper level of subatomic structure, or astronomers extend the reach of their instruments, they expect to encounter additional elegant mathematical order. And so far this faith has been justified.<sup>68</sup>

### 3. A Belief that the Order of the World is Open to the Human Mind

Scientists assume there is an order and rationality behind the universe that science studies and at the same time they assume that the human mind is able to access and understand that rationality. According to philosopher of science Roger Trigg, “an absolute presupposition of science is the human ability to recognize what is true and reason about what could be true.” This is a metaphysical presupposition because it necessarily precedes the study of the nature of the world. “Rationality and the human freedom to exercise it make scientific investigation and argument possible.”<sup>69</sup> Without a firm conviction that “the form of things is intelligible, and therefore definable,” there would be no point in embarking on the scientific quest to make sense of the world.<sup>70</sup> One would not scientifically seek to understand the world unless one already believed that the world could be understood. As physicist and theologian John Polkinghorne elaborates,

We are so familiar with the fact that we can understand the world that most of the time we take it for granted. It is what makes science possible. Yet it could have been otherwise. The universe might have been a disorderly chaos rather than an orderly cosmos. Or it might have had a rationality which was inaccessible to us. . . . There is a congruence between our minds and the universe, between the rationality experienced within and the rationality observed without. This extends not only to the mathematical articulation of fundamental theory but also to all those tacit acts of judgment, exercised with intuitive skill, which are equally indispensable to the scientific endeavour.<sup>71</sup>

Physicist James Gates explains that in order to do science “one has to have a kind of faith that the universe is understandable.” Science, says Gates, “is in fact a

68. Paul Davies, “Taking Science on Faith,” *The New York Times* (November 24<sup>th</sup>, 2007), 61-62.

69. Roger Trigg, *Beyond Matter: Why Science Needs Metaphysics* (West Conshohocken: Templeton, 2015), 71.

70. Michael Foster, “The Christian Doctrine of Creation and the Rise of Modern Natural Science,” *Mind* 43 (1934): 446-68, 455.

71. John Polkinghorne, *Science and Creation: The Search for Understanding* (London: SPCK, 1988), 20-21.

conversation, and you have to have faith that the universe is willing to have that conversation.”<sup>72</sup> Every new scientific research venture assumes that the order present within the universe will lend itself to being understood by the human mind. Because this assumption that the universe will “talk back” is based on faith and cannot be given a scientific explanation, many scientists have found this relationship between our minds and the universe to be surprising and mysterious. Considering this metaphysical mystery, Einstein once reflected, “the most incomprehensible thing about the Universe is that it is comprehensible.”<sup>73</sup> Indeed, remarks Trigg, “the intelligibility and intrinsic rationality of reality cannot be taken for granted” because “this is presupposed within science and cannot be given a scientific explanation.” The presumed rationality and intelligibility of the cosmos is a “metaphysical fact, and the explanation for which, if there can be one, must come from beyond science.”<sup>74</sup>

#### **4. A Belief that the Order of the World is Contingent Rather than Necessary**

According to physicist and philosopher of science Mariano Artigas, “Science shows us an order that is both rational and contingent (that is, its laws and initial conditions were not necessary). It is the combination of contingency and intelligibility that prompts us to search for new and unexpected forms of rational order.”<sup>75</sup> Trigg explains that “it was the constant temptation of ancient thinkers, such as Aristotle, to work out how the world had to be from first principles and to discount the need for a rigorous program of empirical observation and experiment.”<sup>76</sup> The empirical focus of modern science contrasts with the mental and mathematical investigations of the ancient Greeks. “The genius of modern, empirical science, as compared with mere speculation about the nature of the world, is the realization that the physical world does not have to be as it is. It is contingent.”<sup>77</sup> While *necessary* order could be discerned through pure introspective thought (like the truths of mathematics, geometry, or logic), *contingent* or dependent order can be discovered only by making experiments and through investigating what the world is really like. That which is contingent is knowable only by sense experience. There could have been a number of different ways that the universe was put together, but the only way to find out how it actually was put together is to examine it in its details and dynamics. In this way the early scientist Pierre Gassendi (1592-1655) derived from his faith in the

72. S. James Gates, “The Workings of Science,” (AAAS, December 2016), <http://www.science-forseminaries.org/resource/the-workings-of-science/>

73. Albert Einstein, “Physics and Reality,” in *Ideas and Opinions*, trans. Sonja Bargmann (New York: Bonanza, 1954), 292.

74. Trigg, *Beyond Matter*, 59.

75. Artigas, *Mind of the Universe*, 14-15.

76. Trigg, *Beyond Matter*, 76.

77. Trigg, *Beyond Matter*, 76.

contingency of the cosmos a “conviction that empirical methods are the only way to acquire knowledge about the natural world and that the matter of which all physical things are composed possesses some properties that can be known only empirically.”<sup>78</sup> The concept of contingency “is essential to science because contingency demands an empirical method.”<sup>79</sup> Yet, the contingency of the rational order of nature may not be investigated or established through empirical investigation. “The comprehensive presupposition upon which the whole contingent order of things reposes in order to be what it is . . . cannot be established in any way from within the rational frame of the contingent order” itself.<sup>80</sup>

## 5. A Belief in Metaphysical Realism

To engage in scientific theorizing means presupposing that there is a real world of objective physical reality and that one can, at least to some extent, obtain information about that world, which exists independently of the mind. In other words, the attempt to gain knowledge about the world must first presuppose the existence of the world and that the world is not an illusion or virtual reality. “Metaphysical realism,” says philosopher of science Nicholas Rescher, is not the result of an inductive inference, but is rather “a regulative presupposition that makes science possible in the first place.”<sup>81</sup> Metaphysical realism is “a precondition for empirical inquiry,” and “a presupposition for the usability of observational data as sources of objective information.”<sup>82</sup> In this way, says Rescher, “We do not learn or discover that there is a mind-independent physical reality, we presume or postulate it.”<sup>83</sup> Trigg explains, “Science has to assume that it is investigating a world that has an independent existence. Otherwise it is a mere social construction reflecting the conditions of particular societies at a particular time.”<sup>84</sup> The reality of the material world places crucial constraints on scientific theorizing, so true theories must match up with the structures and relationships already existing in nature. For science to make progress, reality as it concretely exists must be

78. Margaret J. Osler, *Divine Will and the Mechanical Philosophy: Gassendi and Descartes on Contingency and Necessity in the Created World* (Cambridge: Cambridge University Press, 1994), 1.

79. Artigas, *Mind of the Universe*, 44.

80. Thomas F. Torrance, “The Transfinite Significance of Beauty in Science and Theology,” in *L’art, la science et la métaphysique: Études offertes à André Mercier*, eds. Luz García Alonso, Evangelhos Moutsopoulos, and Gerhard Seel (Berne: Peter Lang, 1993), 393-418.

81. Nicholas Rescher, *Scientific Realism: A Critical Reappraisal* (Dordrecht: Reidel, 1987), 126.

82. Nicholas Rescher, *Epistemology: An Introduction to the Theory of Knowledge* (Albany, NY: SUNY, 2003), 350.

83. Rescher, *Scientific Realism*, 126.

84. Roger Trigg, “Realism,” in *Encyclopedia of Science and Religion*, ed. J. Wentzel Van Huyssteen (New York: Macmillan Reference, 2003), 714. Biologist and theologian Alister McGrath writes, “There can be little doubt that most natural scientists espouse a range of opinions which are recognizably ‘realist’ in their core affirmations, reflecting a common commitment to the ontological finality of the natural order. Realism works.” Alister McGrath, *A Scientific Theology, Volume. 2, Reality* (London: T & T Clark, 2006), 123.

permitted to change one's previous abstract conceptions of that reality. This is why "scientific discoveries are often quite unexpected."<sup>85</sup> While scientific theories about the nature of reality can be falsified, realism itself, as a metaphysical affirmation cannot. As Trigg explains, "realism cannot be falsified, since the idea of falsification depends on notions of truth and falsity that assume that the world has an independent existence. There could otherwise be no reality to prove us wrong."<sup>86</sup>

## **6. A belief in the unity and uniformity of the physical universe.**

The assumption that physical reality at some deep level is consistent, and that nature functions uniformly, is a fundamental presupposition of all scientific activity. "The idea of the general uniformity of nature," says Trigg, "underpins the conduct of science, and the alternative is to give up science. Discovering it by scientific means begs the question."<sup>87</sup> The "scientific method," explains philosopher of science Karl Popper, "presupposes *the immutability of natural processes*, or the 'principle of the uniformity of nature.'" For example, physicists assume that the speed of light throughout the universe (where it has not been measured) is the same as the speed of light here on Earth (where it has been measured). This principle of uniformity, says Popper, is a "metaphysical faith in the existence of regularities in our world" that necessarily underpins the scientific method as a whole.<sup>88</sup> According to historian of science Reijer Hooykaas "it was not experience alone but also a belief in an order as yet undiscovered—that is, in a certain uniformity of nature—which played, and still plays an important role in science."<sup>89</sup> The assumption that the laws of nature are the same everywhere throughout the cosmos is what allows scientists to extrapolate from presently available knowledge to distant times (e.g., the past in geology and the past and future in cosmology) and to distant parts of the cosmos (e.g., in astronomy and cosmology). Without the postulated uniformity of the cosmos scientists could not make any inductive inferences or predictions.<sup>90</sup> Without this faith in nature's uniformity and unity, says Popper, any practical action within science, would be "hardly conceivable."<sup>91</sup>

These general presuppositions about the nature of reality—the orderliness and regularity of reality, the ontological *reality* of reality, the intelligibility and contingency of existent structures and entities, and the unity and uniformity of the physical universe—necessarily precede and underpin all scientific experimentation

85. Ian Barbour, *Religion in an Age of Science* (San Francisco: Harper & Row, 1990), 44.

86. Trigg, *Beyond Matter*, 100.

87. Ibid.

88. Karl Popper, *The Logic of Scientific Discovery* (London: Unwin Hyman, 1990), 250.

89. Reijer Hooykaas, *Fact, Faith, and Fiction in the Development of Science* (Dordrecht: Kluwer, 1999), 11.

90. Ratzsch, "The Nature of Science," 49.

91. Popper, *The Logic of Scientific Discovery*, 250.



and reasoning. “For science to develop,” says physicist and philosopher Peter Hodgson, “these beliefs must be held, at least implicitly, by society as a whole and by scientists themselves.”<sup>92</sup> Modern science presupposes these beliefs “as the condition of its own possibility.”<sup>93</sup> Such presuppositions (and others) are *a priori* “conditions that are necessary for the possibility of scientific activity as such, although they can be ignored by particular scientists.”<sup>94</sup> As preconditions, they are absolutely required for science to take place and are not open to experimental confirmation or falsification by scientific experimentation. As Trigg explains, “empirical investigation cannot solve metaphysical issues, and if it tries to, it only goes around in circles.”<sup>95</sup> As the necessary conditions for the possibility of science these metaphysical presuppositions, explains Artigas, “continue to be present, not as a kind of philosophical ornament, but as a real part of science itself.” When we study the presuppositions of science, says Artigas, “we are studying science itself in a strict sense.”<sup>96</sup> And such presuppositions continue to significantly impact science today. McMullin says that, while “one might be tempted to think that regulative principles of a broadly metaphysical kind no longer play a role in the natural sciences . . . even a moment of reflection about the current debates in elementary-particle theory, in quantum-field theory, and in cosmology ought to warn that this is far from the case.”<sup>97</sup>

### **Theological Foundations of the General Metaphysical Presuppositions of Science**

All the metaphysical presuppositions listed above, which continue to play a vital role within current science, require a certain degree of faith. Today, scientists often take these philosophical assumptions for granted and their implicit faith in them need not necessarily be considered religious. Historically, however, each of these presuppositions developed within a specific religious context and all were supported and affirmed by particular religious concepts within a particular religious culture. The specific religious context, within which early modern science developed, was the Christian faith as it emerged from Judaism and was passed down from the European

92. Hodgson, *Theology and Modern Physics*, 16. See also Hodgson, “Presuppositions and Limits of Science,” 133-46.

93. Foster, “The Christian Doctrine of Creation and the Rise of Modern Natural Science,” 447

94. Mariano Artigas, “Three Levels of Interaction between Science and Philosophy,” in *Intelligibility in Science*, ed. C. Dilworth (Amsterdam: Rodopi, 1992), 123.

95. Trigg, *Beyond Matter*, 100.

96. Artigas, *Mind of the Universe*, 25.

97. Ernan McMullin, *Newton on Matter and Activity* (Notre Dame: University of Notre Dame Press, 1978), 127.

Middle Ages to the early modern natural philosophers who were the first “scientists.”<sup>98</sup> Historian of science John Hedley Brooke explains, “Prominent natural philosophers of the early modern period did not distinguish what we would call the scientific aspects of their work from what we would call theology. Their study of the natural world was conceived as a study of God’s creation, disclosing something of the nature of God.”<sup>99</sup> Within this cultural matrix, a number of specifically Christian theological understandings of the natural world and the human mind encouraged the development of the foundational presuppositions of science. In other words, “Christian theology provided several of the beliefs on which science is based.”<sup>100</sup>

Physicist, philosopher, and theologian, Ian G. Barbour explains that a number of key metaphysical presuppositions of science are grounded in “the basic *theological affirmations* in the first chapter of Genesis.” Among them are the convictions that “the world is essentially good, orderly, coherent, and intelligible,” that “the world is dependent on God” and thus contingent because “God is sovereign, free, transcendent, and characterized by purpose and will.” Barbour points out that “these are all assertions about characteristics of God and the world in every moment of time, not statements about an event in the past. They express ontological rather than temporal relationships.”<sup>101</sup> Artigas explains how these presuppositions became deeply embedded within the intellectual milieu that gave rise to science:

98. In speaking of the philosophical presuppositions that emerge from the *Christian*, rather than the so-called “Judeo-Christian”, doctrine of creation, I do not intend to exclude *Jewish* understandings of creation which often employ the same or similar concepts. I am merely contextualizing the discussion in order to avoid a lengthy digression regarding what, in fact, Christian and Jewish understandings of creation historically had in common. For example, not all would agree that the notion of *creatio ex nihilo* was explicitly assumed in the Hebrew thought of Genesis or in later Early Jewish conceptions. *Creatio ex nihilo* is unambiguously assumed in the earliest Christian witness, however. In a similar way, the general presuppositions about creation that emerge from Islam, Mormonism, and Process Thought have a great degree of overlap with Christian understandings. This overlap, however, is due to the historical dependence of these later metaphysical perspectives upon the Christian concepts which preceded them. Consequently general presuppositions that are likewise found in Islam may be thought of as originally and primarily Christian.

99. John Hedley Brooke, Margaret Osler and Jitse van der Meer, *Science in Theistic Contexts: Cognitive Dimensions* (Chicago: University of Chicago Press, 2001), ix. Early modern scientists referred to themselves as “natural philosophers.” The “natural philosophy” which Brooke is referring should not be confused with “natural theology” of nineteenth century Deism. Deistic natural theology sought to prove the existence of God without explicit recourse to religious scriptures or reference to theological affirmations or presuppositions. However, Deistic natural philosophy and natural theology were essentially a secularized version of the Christian doctrine of creation (as opposed to being a natural religion that could be derived purely from reason). Deistic natural theology thus still implicitly relied on the philosophical presuppositions supplied by the Judeo-Christian understanding of creation. See Peter A. Byrne, *Natural Religion and the Religion of Nature: The Legacy of Deism* (London: Routledge, 1989).

100. Hodgson, *Theology and Modern Physics*, 17.

101. Ian G. Barbour, *When Science Meets Religion: Enemies, Strangers, or Partners?* (San Francisco: Harper Collins, 2013), 48.

The development of empirical science as a self-sustaining enterprise required . . . a kind of faith in the rationality of the world and also in the human capacity to know that world. In short, empirical science is possible only if our world possesses a strong kind of order and if we are capable of investigating it. Actually, after sharing the Christian faith for several centuries, Medieval and Renaissance Europe was built on a common ground that included, as a basic tenet, the doctrine of creation with all its implications: that the world had been created by an omnipotent and wise God and that, therefore, a natural order exists; that the natural order is contingent, because God's creation is free and thus the world cannot be a necessary product of God's action; that human beings, as creatures who participate in God's nature, can reach a knowledge of that natural order; and finally that owing to the contingent character of the world, in order to reach that knowledge we must not only think, but also perform experiments that allow us to know how our world really behaves.<sup>102</sup>

In the late medieval and early modern periods theological convictions became embodied within philosophical presuppositions and they worked together to form many of the key conceptual underpinnings of modern science. Rather than religion acting as a stumbling block to the rise of science, religion was, in fact, a cornerstone. As historian of science Edward Grant has shown, "in the Latin Middle Ages of Western Europe an intellectual environment was established that proved conducive to the emergence of early modern science." During this formative historical period a combination of cultural attitudes, institutions such as universities, and beliefs critically coalesced into what may be called the "the foundations of modern science."<sup>103</sup> Consider the theological origins for each of the metaphysical presuppositions listed above:

## **1. The Goodness and Worth of the Physical Reality that God Created**

The notion of the world's "goodness" is rooted in the foundational creation narrative of both Judaism and Christianity. In Genesis, God beholds the cosmos he created and asserts that "all that he had made" was indeed "good" (Gen 1:31). The Hebrew word translated as "good" also means "beautiful." The created world here has an intrinsic value and the creatures therein "manifest in the most varied ways the power, wisdom, and goodness of God."<sup>104</sup> In the early Christian understanding, nature was seen as a type of "book" authored by God, and one could come to know God through reading and studying this book. The church father Augustine (354-430) reflects, "Some people, in order to discover God, read books. But there is a great book: the very

102. Artigas, *Mind of the Universe*, 22.

103. Edward Grant, *The Nature of Natural Philosophy in the Late Middle Ages* (Washington, D.C.: Catholic University of America Press, 2010), ix.

104. Artigas, *Mind of the Universe*, 330.

appearance of created things. Look above you! Look below you! Note it; read it. God, whom you want to discover, never wrote that book with ink; instead He set before your eyes the things that He had made. Can you ask for a louder voice than that?”<sup>105</sup> Continuing in this Augustinian train of thought, medieval theologian Hugh of St. Victor (1096-1141) develops specific techniques for the interpretation of the “text of nature.” Hugh advocates the systematic investigation of the natural world “based on the general assumption that living things can be read as signs variously of God’s power, wisdom and goodness.” Discerning the power of God in the immensity of the created cosmos, Hugh likewise sees God’s goodness and wisdom in the elegance and beauty of creatures.<sup>106</sup>

The idea that the world of nature is worth studying, as it entered into the practice of early modern science, is likewise historically rooted in the Jewish and Christian Genesis text. One particularly influential passage that deeply impacted the conceptual foundations of science was Genesis 2:19-20, in which Adam names the animals according to their own identities. Adam’s naming of the different creatures had long been understood as his giving names to them in accordance with their particular natures and characteristics. Jews and Christians believed humans before the Fall had a deep knowledge of nature and that it was Adam’s “encyclopedic knowledge that had made possible the naming” of the various animals.<sup>107</sup> In the 1600s, when Francis Bacon inaugurated the modern scientific endeavor, he drew upon this understanding of Adam’s knowledge of the natural world. Bacon envisioned the natural sciences as a way of “restoring, or at least repairing, the losses to knowledge that had resulted from the Fall.”<sup>108</sup> Historian of science Peter Harrison explains, “Francis Bacon’s project to reform philosophy was motivated by an attempt to determine whether the human mind ‘might by any means be restored to its perfect and original condition, or if that may not be, yet reduced to a better condition than that in which it now is.’”<sup>109</sup> As the disobedience of the first humans caused the human mind to fall into error and lose knowledge, the scientific method was, for Bacon and other early modern practitioners of science, a technique that could work to heal the cognitive damage wrought by human sin. During the scientific revolution, says Harrison, “the methodological strictures of particular programs of natural philosophy—experimental method being perhaps the best example—were understood as applying necessary external constraints to fallen

105. Quoted in Clarence Glacken, *Traces on the Rhodian Shore: Nature and Culture in Western Thought from Ancient Times to the End of the Eighteenth Century* (Berkeley: University of California Press, 1967), 203-4.

106. Peter Harrison, *The Bible, Protestantism, and the Rise of Natural Science* (Cambridge: Cambridge University Press, 1998), 57; Hugh of St Victor, *Didascalicon*, 6.5; *De tribus diebus*, 1.

107. Peter Harrison, *The Fall of Man and the Foundations of Science* (Cambridge: Cambridge University Press, 2007), 26.

108. *Ibid.*, 4.

109. *Ibid.*, 1.

minds which, left to their own devices, would simply fail to accumulate any useful knowledge of the natural world.”<sup>110</sup>

## 2. That God Created an Orderly and Rational Cosmos

The orderliness and rationality of the natural world were similarly assumed by early modern scientists on the basis of the Christian doctrine of creation that was part of their cultural matrix.<sup>111</sup> “The very idea of rationality has certain theological origins, and science as we know it arose in the context of a belief in the rational structure of reality mirroring the higher wisdom of a Creator God.”<sup>112</sup> The concept of God’s creation of all material reality out of nothing (Latin: *creatio ex nihilo*) “allowed the scientist to approach nature with the expectation that the divine rationality would be reflected in its structures and workings.”<sup>113</sup> According to Hooykaas, “The faith in order, law, simplicity, harmony, beauty has often been connected with the faith that there is logos, reason, mind at work in the universe.” The idea that the universe is deeply rational emerges from a “belief in a Mind to which the human mind has, however remotely, some resemblance, so that it is able to recognize these attributes in a creation which is the work of that Mind.”<sup>114</sup>

Past interpretations of the history of science attributed the rationality underlying the scientific endeavor to the influence of the ancient Greeks. This idea that natural science came to the modern world as a legacy from ancient Greece, says Harrison, “continues to exercise a tenacious hold on the popular imagination and still informs many nonspecialist accounts of science and its history.” However, he continues, “historians of science have now largely abandoned much of this narrative.” A “significant deficiency in this common reconstruction of the history of science lies in the assumption that these ancient Greek accounts of the cosmos partake of the ethos of modern science, and that they share to a significant degree its goals and methods.”<sup>115</sup> While the various Greek philosophical schools employed logic in their speculative understandings of the world, they did not generally see the structure of the cosmos as an expression of a rational plan that could—and should—be investigated on a more

110. Ibid., 15.

111. Though anachronistic, the word “scientists” is used here for clarity’s sake.

112. Carl Reinhold Bråkenhielm, “Theology and the Origins of Customized Science” in *The Customization of Science: The Impact of Religious and Political Worldviews on Contemporary Science*, eds. Steve Fuller, Mikael Stenmark and Ulf Zackariasson (London: Palgrave Macmillan, 2014), 121.

113. Alister McGrath, *A Scientific Theology, Volume 1, Nature* (Edinburgh: T & T Clark, 2003), 140.

114. Hooykaas, *Fact, Faith, and Fiction*, 12.

115. Peter Harrison, *The Territories of Science and Religion* (Chicago: University of Chicago Press, 2014), 23-24.

practical and empirical level.<sup>116</sup> Hooykaas explains that “although the Greek atomists made Chance into Necessity (*ananke*), it was a blind necessity, not representing a rational plan. They were not looking for a fixed order (though they did have to admit some fixed principles in nature such as the indivisibility of atoms and the intrinsic heaviness of matter). Their system did not purport to further scientific creativity.”<sup>117</sup> Thus, says Ratzsch, the “general Greek view was in various ways philosophically fruitful, but it did not directly result in any enduring tradition that was identifiably scientific, in the sense of the later Scientific Revolution. In fact, several of the aspects of Greek thought . . . may have hindered development of anything like modern science.”<sup>118</sup> In contrast to the Greek philosophical mindset, Jews and Christians believed that the ways of nature, as the product of the Divine Mind, were reflections of reason and that “even those aspects of nature that threatened human safety were not lawless in themselves. They served God’s purposes and had laws of their own, even if unknown to humans (Job 28:25-27).”<sup>119</sup>

### **3. That God Created the Human Mind to Comprehend God’s Cosmos**

Since God’s creative activity in the cosmos reflects the rationality of the Divine Mind, Christians believe that the inner workings of the cosmos “are open to human comprehension, at least in principle.”<sup>120</sup> As historian of science Christopher Kaiser explains, “The creation of all things by God, the consequent order and rationality of the cosmos, and the ability of human reason to comprehend this order all stem from the Judeo-Christian belief in creation, dating back at least to the second century BCE.”<sup>121</sup> In this way, says theologian Alister McGrath, “human rationality thus bears a created, contingent relationship to—but is not identical with—divine rationality.”<sup>122</sup> Affirming that the natural world could be comprehended, “early Christian scientists sought intelligible order in nature, regarding it as an indication of God’s rational plan for the universe.”<sup>123</sup>

116. Hannam points out that one of the reasons for thi, is that Greek philosophers generally saw trades as beneath them. “Greek philosophers, like Plato and Aristotle...thought that any kind of trade was beneath the dignity of intellectuals,” *The Genesis of Science*, 141.

117. Hooykas, *Fact, Faith and Fiction*, 18

118. Ratzsch, “The Nature of Science,” 57.

119. Christopher B. Kaiser, “Early Christian Belief in Creation and the Beliefs Sustaining the Modern Scientific Endeavor,” in *The Blackwell Companion to Science and Christianity*, ed. J. B. Stump and Alan G. Padgett (Malden, MA: Blackwell, 2012), 6.

120. Ibid.

121. Ibid., 10.

122. Alister E. McGrath, *The Open Secret: A New Vision for Natural Theology* (Malden, MA and Oxford: Blackwell-Wiley, 2008), 192.

123. Paul Davies, “The intelligibility of nature,” in *Scientific Perspectives on Divine Action: Quantum Cosmology and the Laws of Nature*, eds. Robert J. Russell, Nancey Murphy, and C.J. Isham (Berkeley, CA: CTNS and Vatican Observatory Publications, 1999), 149-64.



#### 4. The Created Contingency of the Cosmic Order

According to the Christian theological context within which the natural sciences developed, “God is the creative ground and reason for the contingent but rational unitary order of the universe.”<sup>124</sup> The “Christian doctrine of creation” affirms that “the universe is both inherently intelligible and inherently contingent, its intelligibility reflecting its contingent origins in the rationality of God.”<sup>125</sup> The belief that the order of the world is contingent rather than necessary is ultimately grounded in the Christian conception of the freedom of God.<sup>126</sup> Inherent in the Christian doctrine of *creatio ex nihilo*, which provided the conceptual matrix for early modern science, is the belief that God was free to choose how to create the universe. “Biblical thought held that the world’s order is contingent rather than necessary. If God created both form and matter, the world did not have to be as it is, and one has to observe it to discover the details of its order.”<sup>127</sup> God “was not in any way constrained either to create or not to create it in the way that He did. It is therefore not a necessary universe in the sense that it had to be created or could not have been created otherwise.”<sup>128</sup> Given this understanding of nature, one can never say *a priori* (independently of observation) how God *must have* acted, and thus one can never say *a priori* how God’s creation must behave. To obtain true knowledge about God’s creation one must proceed in an *a posteriori* manner—by studying the material creation and by conducting experiments.<sup>129</sup> Thus early scientists such as “Gassendi described a world utterly contingent on divine will. This contingency expressed itself in his conviction that empirical methods are the only way to acquire knowledge about the natural world and that the matter of which all physical things are composed possesses some properties that can be known only empirically.”<sup>130</sup> More recently, the essential affirmation of the contingency of the cosmic order “can be seen as lying behind both James Clerk Maxwell’s insistence that there exists an inner relation between the laws of the mind and the laws of nature, and Albert Einstein’s belief in a ‘pre-established harmony’ between the intelligibility of the independent world and the perceiving subject.”<sup>131</sup>

#### 5. The Independent Reality of the Created Cosmos

124. Artigas, *Mind of the Universe*, 15.

125. McGrath, *Open Secret*, 237.

126. Kaiser, “Early Christian Belief in Creation,” 5. McGrath writes, “The creator is to be regarded as free of limitations imposed by the ‘inertia of a prior reality’” (McGrath, *A Scientific Theology*, 1.195).

127. Barbour, *When Science Meets Religion*, 48.

128. Hodgson, *Theology and Modern Physics*, 26. See also Osler, *Divine Will and the Mechanical Philosophy*.

129. Michael Foster, “Greek and Christian Ideas of Nature,” *The Free University Quarterly* 6 (1959): 125; McGrath, *Scientific Theology*, 2.139.

130. Osler, *Divine Will and the Mechanical Philosophy*, 1.

131. McGrath, *The Open Secret*, 237.

Related to the contingency of the order in the physical world is the notion of metaphysical realism. Metaphysical realism is grounded in the Jewish affirmation that God created the natural world to possess a significant degree of relative autonomy or independence.<sup>132</sup> Inheriting the metaphysical framework of its Jewish forbearers, the Christian theological tradition clearly presupposed and applied a philosophical faith in the existence of the external world, which has a structure that is independent from the human mind.<sup>133</sup> In the Jewish and Christian understandings, the material creation exists independently of the observer because God the creator exists and bestowed existence on both the human observer and the created objects being observed. The reality of both the external world and the human observer are affirmed because they are the creation of the same God.<sup>134</sup> The material world is understood as having its own reality owing to the fact that creation is independent or distinct from the Creator.<sup>135</sup>

“On the Christian conception . . . nature is made by God, but *is not God*. There is an abrupt break between nature and God. Divine worship is to be paid to God alone, who is *wholly other than nature*. Nature is not divine.”<sup>136</sup> Barbour refers to this presupposition about the independent reality of the cosmos as a belief in the dedivinization or desacralization of nature.<sup>137</sup> As the independent creation of God, “the Christian cosmos is not inhabited by deities. Yet, as a divine creation it does bear deep theological significance.”<sup>138</sup> Within the religions of the ancient world, Christians and Jews were unique in their denial of the divinity of the celestial bodies and “this skepticism was motivated by a theological worldview.”<sup>139</sup> Because of this disbelief in the divinity of the sun, moon, earth, planets, and stars, Christians were often labeled as atheists and they were lumped together with the Epicureans who did not believe in any gods at all. The Neoplatonist philosopher Celsus and other educated pagans ridiculed Jews and Christians for their impiety in this matter. The atheist reputation of Christians continued into late antiquity with the Aristotelian philosopher Simplicius, “being horrified at the blasphemy” of the Christian philosopher John Philoponus (490-570), “who denied divinity to heavenly bodies.”<sup>140</sup> Following the thought of Basil of Caesarea, Philoponus’ theology led him to believe “that the motion of the heavens was to be explained by a ‘motive force’ imparted by God at the moment of creation.”<sup>141</sup>

132. Christopher Kaiser, “Early Christian Belief in Creation,” 7.

133. McGrath, *Scientific Theology*, 2.199.

134. *Ibid.*, 2.172, 228.

135. “The reality of God and the derived and contingent reality of the creation can thus be seen as distinct” (*Ibid.*, 2.228).

136. Foster, “Greek and Christian Ideas of Nature,” 123-24; See also Artigas, *The Mind of the Universe*, 22.

137. Barbour, *When Science Meets Religion*, 48.

138. Harrison, *Territories*, 53.

139. *Ibid.*

140. *Ibid.*

141. *Ibid.*

Philoponus's view of the independence and reality of the creation "supposed a unified theory of dynamics" where all natural motion was imparted upon creation by God. Philoponus's conception of impetus subsequently influenced Galileo and all those early scientists who would follow in his footsteps.

## 6. The Unity of Creation as Grounded in the Unity of God

The affirmation of the unity and uniformity of the physical universe was likewise a core belief emerging from a Judeo-Christian understanding of the unity of creation as the product of a single Creator. While many ancient schools of thought "drew a sharp line between the starry heavens and the terrestrial realm," the Christian tradition insisted on "a single physics for both heaven and earth."<sup>142</sup> This conception of the cosmos had become well established in the early church and was passed down to later Islamic and medieval Christian thinkers. It was then handed on from the leading natural philosophers of the Middle Ages to the practitioners of early modern science. When early modern scientists, such as Isaac Newton, argued for the universality of the laws of nature they justified this principle in theistic terms. Newton says, "If there be an universal life and all space be the sensorium of a thinking being [(God)] who by immediate presence perceives all things in it, [then] the laws of motion arising from life or will may be of universal extent."<sup>143</sup> In the nineteenth century, the "quest for a unification of electricity, magnetism, and optics, culminating in the work of James Clerk Maxwell, was still inspired by this theological ideal."<sup>144</sup> Theological presuppositions about the unity of creation also clearly motivated Michael Faraday in his scientific quest to discover the fundamental principles underlying electromagnetism and electrochemistry. As historian of science Colin Russell says, "No doubt Faraday's belief in the unity of the forces of matter was reinforced by his faith in a Creator who made the whole universe work together in harmony."<sup>145</sup> The influence of this theological affirmation also played a vital role in the development of cosmological theory in the 20<sup>th</sup> century. According to Brooke, "the inculcation of a Jewish monotheism early in life had a lasting effect in the way Einstein was driven, as

142. Christopher Kaiser, "The Creationist Tradition in the History of Science," *Perspectives on Science and Christian Faith* 45 (June 1993): 80-89.

143. Ratzsch, "The Nature of Science," 65. A *sensorium* is the sum of an organism's perception, the "seat of sensation" where it experiences and interprets the environment it lives within.

144. Kaiser, "The Creationist Tradition in the History of Science," 80. McGrath observes, "Since the uniformity of nature is an unjustified (indeed, circular) assumption within any non-theistic world-view, it could be argued that there is no firm basis upon which to engage in scientific activities, other than the belief that the regularities observed locally prove universal" (McGrath, *Scientific Theology*, 2.153).

145. Colin Russell, *Michael Faraday: Physics and Faith* (New York: Oxford University Press, 2000), 105.

many physicists still are, to seek a theory that would unify the fundamental physical forces.”<sup>146</sup>

### **Particular and Contextual Metaphysical Presuppositions of Science**

In addition to the *general* philosophical presuppositions that are provided—both historically and presently—there are also *particular presuppositions* or metaphysical assumptions that correspond to particular *metaphysical frameworks* and *research paradigms* within which scientific theorizing may take place.<sup>147</sup> These particular metaphysical assumptions and paradigms play a more circumscribed role within scientific theorizing than the general presuppositions and are often related to certain stages in the historical development of a given scientific theory.

For example, the commandment to humans in Genesis to exercise dominion over nature played an important role in the rise of early modern science that it no longer plays today. In the Middle Ages many believed “that Adam’s original dominion over the creatures in the Garden of Eden consisted in a mental mastery of what it was that they represented.”<sup>148</sup> One consequence of the Fall was that this original knowledge (or *science*) was lost, and the powers of the mind—“sense, imagination, reason, understanding, intelligence, and moral discernment—were distorted by sin.” The recapturing of this lost mastery and knowledge of nature “could be achieved only if the powers that had originally made it possible were ‘cleansed by righteousness, trained by learning, and perfected by wisdom.’”<sup>149</sup> The scientific enterprise that began in the late medieval period was aimed at gaining knowledge of the natural world in order to restore to the human mind some of its original powers and perfections. In this way, says Harrison, the biblical injunction to exercise dominion, “underpinned the modern scientific project, providing an important source of motivation for the investigation of nature and giving religious legitimacy to a project that . . . was more vulnerable in its early stages than we have sometimes assumed.”<sup>150</sup>

As another example, consider the period when the geological sciences were first developing in seventeenth and eighteenth century Europe.<sup>151</sup> At this time one important particular presupposition that was a matter of significant debate between geologists was related to the question of whether the planet Earth had a beginning and changed progressively through time, or alternatively, whether Earth

146. John H. Brooke, “Preface,” in *Science in Theistic Contexts: Cognitive Dimensions, Osiris* 16, eds. John H. Brooke, M.J. Osler, J.M. Van der Meer (Chicago: University of Chicago Press, 2001), viii.

147. Scientific research paradigms are “standard examples of scientific work that embody a set of conceptual and methodological assumptions.” See Barbour, *Religion in an Age of Science*, 51.

148. Peter Harrison, *Territories*, 65.

149. *Ibid.*, 66.

150. *Ibid.*, 137

151. For a detailed discussion see Joshua Moritz, *Science and Religion*, 44-48.

was *infinitely old* (without beginning or end) and characterized by non-progressive cyclical geological processes.<sup>152</sup> The first view is known as Historical Geology and the second view—an idea that had been promoted by Aristotle and other ancient thinkers—is Aristotelian Eternalism (or Geologic Eternalism). Before the relevant empirical evidence was available to decide between the two alternative theories of time, history, and progressive change as it related to Earth’s processes, discussions among early geologists about the timescale of the world was deeply colored by a “clash of theologies.” As historian of geology Martin Rudwick explains, this “was not a case of ‘Religion versus Science,’ but of one religious view of the world against another.”<sup>153</sup> At that point in time, there was not conclusive empirical evidence to demonstrate whether the planet Earth had a physical beginning or whether it was, in fact, eternal. The working assumption that Earth was a historical entity thus served as a particular presupposition that, as evidence was accumulated in its favor, would—in time—no longer be a matter of philosophical or theological faith.

A third example of a particular presupposition is found in Charles Darwin’s context of discovery. At the core of Darwin’s scientific quest to establish the common ancestry of all life was a *theologically* and *morally* inspired conviction in the ancestral unity of humanity.<sup>154</sup> This conviction motivated and drove Darwin’s research agenda. According to Darwin’s biographers, Adrian Desmond and James Moore, “Rather than seeing ‘the facts’ force evolution on Darwin, “we find a *moral* passion firing his evolutionary work. He was quite unlike the modern ‘disinterested’ scientist who is supposed (supposed, mark you) to derive theories from ‘the facts’ and only then allow the moral consequences to be drawn.”<sup>155</sup> The notion of human unity—along with the corresponding rejection of slavery—was a key element of Darwin’s family heritage. “Adamic unity and the brotherhood of man were axiomatic in the anti-slavery tracts that he and his family devoured and distributed. It implied a single origin for black and white, a shared ancestry.”<sup>156</sup> When Darwin began his evolutionary quest in search of human origins, his “starting point was the abolitionist belief in blood kinship, a ‘common descent’” for all human beings. And this deep conviction and faith in the unity of the human race “was the *unique* feature of Darwin’s peculiar brand of evolution.”<sup>157</sup> As evidence for the common ancestry of humanity and all of life

152. Alan H. Cutler, “Nicolaus Steno and the Problem of Deep Time,” in *The Revolution in Geology from the Renaissance to the Enlightenment*, ed. Gary D. Rosenberg (Boulder, CO: Geological Society of America, 2009), 143–48, 143.

153. Martin Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution* (Chicago: University of Chicago Press, 2005), 118

154. For a detailed discussion see Joshua M. Moritz, *Science and Religion: Beyond Warfare and Toward Understanding* (Winona, MN: Anselm Academic, 2016), 48–51.

155. Adrian Desmond and James Moore, *Darwin’s Sacred Cause: How a Hatred of Slavery Shaped Darwin’s Views on Human Evolution* (Boston: Houghton Mifflin Harcourt, 2009), xviii.

156. Desmond and Moore, *Darwin’s Sacred Cause*, 54, xvii.

157. Desmond and Moore, *Darwin’s Sacred Cause*, xvii.

was increasingly found, the particular presupposition of Adamic Unity became less important as a guiding principle.

Whether scientists are aware of them or not, particular presuppositions never disappear from science. All data collected via the scientific method and the interpretation of this data is dependent upon the particular research paradigm within which that data is considered. Such data is never free of the theoretical assumptions related to a given paradigm and the choice of one research paradigm over another is not dictated by scientific research in itself.<sup>158</sup> Unless a scientist is so radically aware of his or her own metaphysical presuppositions that he or she can systematically strive to replace them with other presuppositions, scientific theories will inevitably be formulated and interpreted in such a way as to achieve consistency with dominant metaphysical presuppositions.

### **Conclusion**

Because non-empirical shaping principles are a key part of what science *is*—as Thomas Kuhn and many other historians and philosophers of science have shown—science really does need faith. Such faith *within* science takes a number of different forms, including ethical values, aesthetic principles, philosophical commitments, metaphysical presuppositions, and theological motivations. Philosopher of science Delvin Ratzsch explains, “Doing science requires use of presuppositions involving criteria for theory construction, theory evaluation, and boundaries of concept legitimacy, plausibility structures, and a host of other matters.”<sup>159</sup> Since such factors both precede and inform the practice of science, “science itself cannot provide the rational justification for them.”<sup>160</sup> Science, then, appears to critically depend upon values and presuppositions that are not the result of scientific discovery or testing. Since they “lie somewhere beyond the borders of science,” they cannot be directly evaluated through empirical investigation.<sup>161</sup> Many of the values and presuppositions that the practice science is founded upon come either directly or indirectly from the specific theological context of the Judeo-Christian tradition. In fact, it would seem that the Judeo-Christian understanding of a real and unified cosmic physics with an intelligible, orderly, and rational structure that could and should be discovered

158. See Barbour, *Religion in an Age of Science*, 52.

159. Delvin Ratzsch, “The Nature of Science,” in *Science and Religion in Dialogue*, ed. M. Y. Stewart (Oxford: Wiley-Blackwell, 2010), 47.

160. Ibid.

161. Ibid.



was a necessary (though not sufficient) condition for the rise of science.<sup>162</sup> Today, scientists can either take these presuppositions for granted as givens (albeit in a rather philosophically arbitrary manner), or seek to provide a deeper philosophical justification for them by appealing to the theological worldview that they emerge from. Alternatively, scientists motivated by non-Judeo-Christian or atheistic social contexts may decide to reject specific presuppositions (such as Ockham's Razor, the rationality of nature, the intelligibility of nature, ontological realism, or the unity of the laws of nature) and seek to find other guiding presuppositions from non-religious or non-Judeo-Christian contexts. For the present, the vast majority of science is produced under the guiding light of theistically derived philosophical presuppositions. As Davies says, "Science began as an outgrowth of theology, and all scientists, whether atheists or theists accept an essentially theological worldview."<sup>163</sup> Whether or not there can be a different science, however, a science with alternative—non-Judeo-Christian or atheistic—guiding assumptions, and whether or not such a science can thrive as a knowledge producing enterprise, will remain to be seen if and when individual scientists decide to give up the classical philosophical assumptions of science in exchange for a novel set of assumptions.

162. This point is extensively developed by Cambridge historian of science Joseph Needham, the greatest Western interpreter of the history of science in China. Needham has argued that this Judeo-Christian metaphysical faith in the rationality of the Creator was one of the key reasons that theoretical science developed and flourished in a European context in a way that it never did in a Chinese context—even though technology in China was well-developed. Needham explains that in China, "the highest spiritual being known and worshipped was not a Creator in the sense of the Hebrews and the Greeks. It was not that there was no order in Nature for the Chinese, but rather that it was not an order ordained by a rational personal being, and hence there was no guarantee that other rational personal beings would be able to spell out in their own earthly languages the pre-existing divine code of laws which he had previously formulated. There was no confidence that the code of Nature's laws could be unveiled and read, because there was no assurance that a divine being, even more rational than ourselves, had ever formulated such a code capable of being read." Joseph Needham, *Human Law and the Laws of Nature in China and the West* (L.T. Hobhouse Memorial Trust Lecture, Cambridge University Press, 1951), 41-42.

163. Paul Davies, *Are We Alone?* (New York: Basic Books, 1995), 138.

## ***The “Conflict Thesis” of Science and Religion: a Nexus of Philosophy of Science, Metaphysics, and Philosophy of Religion***

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**Abstract:** The idea of inevitable and perpetual conflict between science and religion is known among historians as the “conflict thesis.” It exploded in popularity in the late nineteenth century with the rise of the Victorian scientific naturalists to positions of leadership in prominent scientific institutions. A common misperception exists concerning the two authors most central to the widespread dissemination and lasting popularity of the conflict thesis: John William Draper and Andrew Dickson White. This misperception assumes that because Draper and White pitted science and religion at odds, they were not themselves theologically engaged. On the contrary, Draper and White held very specific theological views and championed them in their written works. Like others at the time, they shaped their theology to conform to their vision of science, a vision articulated by scientific naturalism, with its commitments to inviolable natural laws and nature as a closed system of physical causes. They viewed their theologies as the solutions that would bring peace in the conflict between science and religion. Since the commitments shared by the Victorian scientific naturalists remain central in science as it is conceived to the present day, the theological adjustments to accommodate them also continue. To understand the work of Draper, White, and other leading Victorian scientific naturalists offers valuable insight into the nexus of philosophy of science, metaphysics, and philosophy of religion both in the late nineteenth century and in the ongoing scholarly discussion of divine action today.

**Key Words:** conflict thesis, Victorian scientific naturalism, God of the Gaps, philosophy of science, metaphysics, divine action

## Introduction

The idea that science and religion have engaged perpetually in conflict throughout history has been called the “idea that wouldn’t die.”<sup>1</sup> It owes much of its popularity to two widely read works of the latter nineteenth century: John William Draper’s *History of the Conflict Between Religion and Science* (1874) and Andrew Dickson White’s *A History of the Warfare of Science with Theology in Christendom* (1896). Less well-known is the fact that Draper and White had their own theological positions. Not only did they openly promote their own theological views, they did so within these very works. What is more, both men claimed not to be promoting conflict between science and religion but to be *resolving* it. They perceived themselves not as antagonists, but as peacemakers. The proper response to their works, they believed, was a newly found peace and harmony between science and religion. That this is so raises a host of questions about what historians of science and religion have come to call the “conflict” or “warfare” thesis. Of these, the questions addressed here are the following: how was the popularization of the conflict thesis connected to the simultaneous rise of Victorian scientific naturalism, how and why did Draper and White’s theology develop out of apparent conflict between science and religion, and what light does that shed on contemporary debates about science and religion? Contemporary discussion is represented by Alvin Plantinga’s critique of the Divine Action Project in *Where the Conflict Really Lies: Science, Religion, and Naturalism* (2011), Lydia Jaeger’s *What the Heavens Declare: Science in the Light of Creation* (2012) and James Stump’s *Science and Christianity: An Introduction to the Issues* (2017). To answer these questions means encountering the concerns of the conflict thesis as emerging at a nexus of philosophy of science, metaphysics, and philosophy of religion.

## I: Conflict with a Twist

The years in which Draper and White published their narratives of conflict encompass a greater timespan than that normally associated with the dates of their most famous works. Draper, a chemist, and co-discoverer of photography, had already published at length on science and religion in historic and unavoidable conflict a decade earlier in his six-hundred and twenty-two page *A History of the Intellectual Development of Europe* which appeared in 1863. That manuscript had been completed five years earlier in 1858.<sup>2</sup> Many of his theories of the laws governing nature and human societies appear in his work in the early 1840s and include the added influence of August

1. Jon H. Roberts, “‘The Idea That Wouldn’t Die’: The Warfare Between Science and Christianity,” *Historically Speaking* 4, no. 3 (2003): 21-24.

2. John William Draper, *A History of the Intellectual Development of Europe* (Honolulu HI: University Press of the Pacific, 2002), iii.

Comte by 1865.<sup>3</sup> In 1860, he presented the book's central thesis as a paper before the Royal Society seated alongside Samuel Wilberforce and Thomas Henry Huxley, who then proceeded to engage in their famous verbal scuffle over Darwin. He planned to bring it to press in 1861 but delayed in finding a publisher due to the outbreak of another and more tragic conflict known as the American Civil War. Within a year of its release, the *History of the Intellectual Development* was already sold out and required a second addition.<sup>4</sup> It soon appeared in the hands of readers as far away as the Ottoman Empire. In spite of its success, it was Draper's 1874 abridgment of this work for popular consumption that, with slight modifications, became an immediate runaway international best seller. That abridgment was, of course, his famous *History of the Conflict Between Religion and Science*.<sup>5</sup>

The younger White, meanwhile, was not idle. Although raised an Episcopalian, he had already developed many of his views on science and religion in his youth through Unitarian influences that tended to favor a respectable deism. These views intensified during his student years at Yale in the 1850s. Although then theologically conservative, New Haven offered access to the leading Unitarian churches of Boston and New York. After graduation, White studied in Berlin. There he contracted dual contagions — he caught the bug to teach history and the bug of educational reform on the model of the German university. Returning to America he found employment as a professor of history at the University of Michigan, then attempting German-type reforms. Five years later, while serving in the New York Senate, White capitalized on an opportunity to found a new university on the German model — Cornell. White served as its first president for eighteen years. In 1884, he also became the first president of the newly formed professional body for historians, the American Historical Association.<sup>6</sup> His reputation as an academic historian and influential university president bestowed significant scholarly authority on the thesis that Draper had catapulted to international notoriety.<sup>7</sup>

3. Lawrence M. Principe, "Origins of the Warfare/Conflict Thesis," in *The Idea That Wouldn't Die*, ed. Jeffery Hardin and Ronald L. Numbers (forthcoming).

4. Draper, *Intellectual Development*, iii-iv.

5. Donald Fleming, *John William Draper and the Religion of Science* (Philadelphia: University of Pennsylvania Press, 1950), 93, 193; Leslie Howsam, "An experiment with science for the nineteenth-century book trade: the International Scientific Series," *British Journal for the History of Science* 33 (2000): 198; Ronald S. Wilkinson, "Introduction," in John William Draper, *Life of Franklin*, ed. Ronald S. Wilkinson (Washington, D.C.: Library of Congress, 1977), xi; Jeffrey Russell, *Inventing the Flat Earth: Columbus and Modern Historians* (New York: Praeger, 1991), 41.

6. Andrew Dickson White, *Autobiography of Andrew Dickson White*, vol. 1 (New York: The Century Co., 1905), 277-78; Andrew D. White, "On Studies in General History and the History of Civilization," *Papers of the American Historical Association* 1 (1886): 49; [https://www.historians.org/about-aha-and-membership/aha-history-and-archives/presidential-addresses/andrew-dickson-white-\(1884\)](https://www.historians.org/about-aha-and-membership/aha-history-and-archives/presidential-addresses/andrew-dickson-white-(1884)) (accessed 6/30/2017).

7. David C. Lindberg and Ronald L. Numbers, "Beyond War and Peace: A Reappraisal of the Encounter Between Christianity and Science," *Church History* 55, no. 3 (1986): 340; Russell, *Inventing the Flat Earth*, 41.

In the 1860s, neither the University of Michigan nor Cornell was secular in the way we would think of a non-religiously affiliated university today. Rather, as White described them in his autobiography, they were essentially non-denominational Christian universities with mandatory chapel services and a professoriate that represented the wider diversity of American denominational life. Nevertheless, the appearance of such large universities, bolstered by state support and not governed by a conventional religious body, threatened the interests of the private religious universities under denominational control and brought strident opposition.<sup>8</sup>

Concerned therefore about the conflict between restrictive denominational interests and unfettered intellectual progress, White began lecturing and writing on the conflict between science and religion, not yet aware that this would also become his defining life's work. In 1869, White gave a lecture at the Cooper Union in New York, entitled "The Battle-fields of Science." Its central argument would appear unchanged throughout all of his later writing on the subject from that year through the appearance of his two-volume autobiography in 1905. The 1869 lecture was immediately reprinted the next day in full in the *New York Tribune* at Horace Greeley's request. White's new venture was off to a notable start. In 1876 he expanded the lecture into *The Warfare of Science*, a short work that he continued to develop during the next twenty years. In 1896 he released his detailed two-volume magnum opus of over eight hundred pages, *A History of the Warfare of Science with Theology in Christendom*.<sup>9</sup>

The surprising theme found in both authors' best-known works, given their titles of *Conflict* and *Warfare*, is that Draper and White both agreed that religion could find a positive future if it embraced wholeheartedly the findings of science and shaped its theology accordingly. In the introduction, Draper asserted that two great branches of Christianity, Protestantism and the "Greek Churches," would be largely absent in the narrative of conflict about to unfold. Roman Catholicism, because of its authoritative and unchanging dogma and its exercise of civil power, was "absolutely incompatible" with science, and received blame for most of the conflict. Whether there might be a path to future reconciliation between the two, Draper saw "formidable, perhaps insuperable obstacles." The Greek branch, in his opinion, had "never, since the restoration of science, arrayed itself in opposition to the advancement of knowledge." Instead it had awaited reconciliation of apparent discrepancies between science and theology "and has not been disappointed."<sup>10</sup> But how was Protestantism to be absolved? Draper's prescription offers an initial glimpse into his theological designs. In the closing pages, Draper also raised hope for Protestantism if the Protestant churches "would only live up to the maxim taught by Luther." That maxim, "the right

8. White, *Autobiography*, vol. 1, 299.

9. *Ibid.*, 437.

10. John William Draper, *History of the Conflict Between Religion and Science*, 4th ed. (New York: D. Appleton and Co., 1875), x.

of private interpretation,” if applicable to biblical revelation must also be extended to “the book of Nature.” Between science and Protestantism, then, there existed “a friendship, that misunderstandings have alienated,” waiting “to be restored.”<sup>11</sup> The friendship was by no means an equal partnership, as virtually every traditional Christian belief would have to be jettisoned—from the virgin birth, miracles, the resurrection, to the doctrine of the Trinity.

In contrast, White viewed all the branches of Christianity as equal opportunity offenders, but at the same time he reacted against Draper’s account as too negative. White asserted that conflict was temporary and a rapprochement of science and religion would be the ultimate outcome of these struggles. He assured:

In all modern history, interference with science in the supposed interest of religion—no matter how conscientious such interference may have been—has resulted in the direst evils both to religion and science, and *invariably*. And, on the other hand, all untrammelled scientific investigation, no matter how dangerous to religion some of its stages may have seemed, temporarily, to be, has invariably resulted in the highest good both of religion and science. I say *invariably* — I mean exactly that. It is a rule to which history shows not one exception.<sup>12</sup>

That is the statement as it appeared in the *New York Tribune* in 1869, the day after he delivered it. He later removed the last sentence, made minor punctuation changes, and replaced a single word with a synonym. Other than that, the statement appeared identically in his *Warfare of Science* (1876), his 1896 magnum opus, and his autobiography of 1905. However, his vision for religion would also mean abandoning the major doctrines of Christianity.

That both men developed their general outlooks closer to the middle of the century and both deployed them in print around the year 1875 prompts the question of whether or not deeper causal agents were at work. Certainly, White was influenced by Draper’s earlier piece of 1863, as he acknowledges. That said, there is more to the story. One such causal agent was that the conflict thesis was not a new idea. The trope can be found in England at the turn the seventeenth century, as an appeal among Christians to emancipate natural philosophy from theological restrictions. In the eighteenth century, deists adapted the storyline to promote their theological cause. Deists painted the traditional Christian commitment to divine supernatural revelation as an obstacle to the growth of human knowledge and the source of all sorts of human suffering. Meanwhile, they claimed for their own “natural religion”

11. Ibid., 363.

12. Andrew D. White, “First of the Course of Scientific Lectures: Prof. White on ‘the Battle-Fields of Science,’” *New-York Tribune* (December 18, 1869): 4.



R. Clinton Ohlers: *The “Conflict Thesis” of Science and Religion* a superior commitment to objective enquiry.<sup>13</sup> Nevertheless, it required the unique developments of the middle and late nineteenth centuries to propel the conflict thesis to international bestseller status.

## II. Science, Christianity, and Victorian Scientific Naturalism

To understand the intellectual developments of the late nineteenth century, it is helpful to recall that the dominant religious perspective in the English-speaking world at that time was Christianity, and it is helpful to think of the scientific advancements of that century that impinged on Christianity as of two types, discrete and large-scale. Discrete types of discoveries could bring into question particular passages in the Bible, specific theological assumptions, or commonly held interpretations, but they were discrete in the sense that they were separate and detached from the larger Christian worldview of classical theism. They did not impinge upon the belief in a God who created the universe and could also act miraculously within it. Discoveries early in the 1800s, such as those that indicated that the earth must be much older than 6,000 years are an example of the discrete type. As much as such challenges appealed to skeptics, they presented a manageable interpretative challenge for believers. That this was the case is attested by the speed with which believing scientists and theologians developed alternative interpretations to account for greater time spans, such as the “Gap” and “Day-Age” theories for the Genesis days. Certainly, it helped that precedence for interpreting the days as other than as literal twenty-four hour periods stretched back to the era of the Church Fathers.<sup>14</sup> Even the earlier Copernican revolution, although enormous in its scale in that it restructured the common understanding to the entire universe, was nevertheless discrete in terms of belief. Its resolution for Christianity required only the reinterpretation of a few verses of sacred poetry.

More challenging but still discrete in character, was the discovery of the ancient past of the human race. Not until 1858, the year before Darwin’s *Origin* appeared, did a scientific discovery provided concrete evidence of a much deeper past for humanity. Charles Lyell’s *Antiquity of Man* appeared on the subject in 1863. Yet, even this challenge was met by reinterpreting passages of the Old Testament in light of the new evidence. The renowned historian and philosopher of science William Whewell, Master of Trinity College, Cambridge, himself a devout Christian, attested to both the impact and the potential for resolution in a letter dated January 4, 1864.

13. For a detailed history of these developments see R. Clinton Ohlers, *The Birth of the Conflict Between Science and Religion* (forthcoming); for a brief, informative overview, see Peter Harrison, “That Religion Has Typically Impeded the Progress of Science,” in *Newton’s Apple and Other Myths About Science*, ed. Ronald Numbers and Kostas Kampourakis (Cambridge, MA: Harvard University Press, 2015), 199-200.

14. Andrew J. Brown, *The Days of Creation: A History of Christian Interpretation of Genesis 1:1-2:3* (Blandford Forum: Deo Publishing, 2014).

Corresponding about Lyell's new book with a close friend, the Scottish physicist and Principal of St. Andrews, James David Forbes, Whewell wrote:

I cannot see without some regrets the clear definite line, which used to mark the commencement of the human period of the earth's history, made obscure and doubtful. . . . It is true the reconciliation of the scientific with the religious view is still possible, but it is not so clear and striking as it was. But it is a weakness to regret this; no doubt another generation will find some way of looking at the matter which will satisfy religious men. I should be glad to see my way to this view, and am hoping to do so soon.<sup>15</sup>

By contrast, several discoveries took place from the tail end of the eighteenth century through the better part of the nineteenth century that could be interpreted by those skeptical of traditional Christianity as posing a large-scale challenge to traditional theism itself. In 1796, the astronomer Pierre-Simon Laplace introduced the nebular hypothesis, proposing that the solar system was the result of natural developments over a lengthy period of time, thereby bringing the heavens under the rule of natural law.<sup>16</sup> Laplace also assumed that nature was a closed, deterministic system of natural laws, not open to divine intervention from outside of it.<sup>17</sup> In 1828, Friedrich Wöhler unexpectedly synthesized urea from ammonium cyanate. Urea was thought only to be produced by living organisms. Herman Kolbe made a similar synthesis from coal, diminishing the apparent separation of life from non-living elements. In the following decades, Wöhler's experiment achieved a mythic and exaggerated significance among chemists, particularly after Wöhler's death in 1882.<sup>18</sup> The outcome was understood to bring chemistry into the fold of naturalized sciences. In the 1840s, Julius Robert von Mayer, James Prescott Joule, and Hermann von Helmholtz established the first law of thermodynamics, known as the conservation of energy, which states that energy is neither created nor destroyed, but remains constant in a closed system.<sup>19</sup>

If anything captured the imagination of a religious skeptic in the mid to late nineteenth century it was faith in the primacy and inviolability of natural laws. From the point of view of those skeptical of Christianity, the capstone of these developments was the 1859 publication of Darwin's *Origin of Species*. Although all of these developments, including evolution (divinely directed and with certain limits), were rapidly appropriated by many conservative Christians in the nineteenth

15. Isaac Todhunter, ed., *William Whewell, Master of Trinity College, Cambridge: An Account of His Writings*, vol. 2 (London: Macmillan and Co., 1876), 435-37.

16. Ronald L. Numbers, *Creation by Natural Law: Laplace's Nebular Hypothesis in American Thought* (Seattle: University of Washington Press, 1977), vii-viii.

17. Alvin Plantinga, *Where the Conflict Really Lies: Science, Religion, and Naturalism* (New York: Oxford University Press, 2011), 85.

18. Peter Ramberg, "That Friedrich Wöhler's Synthesis of Urea in 1828 Destroyed Vitalism and Gave Rise to Organic Chemistry," in *Newton's Apple and Other Myths About Science*, ed. Ronald Numbers and Kostas Kampourakis (Cambridge, MA: Harvard University Press, 2015), 60-61, 66.

19. Plantinga, *Where the Conflict Really Lies*, 78.

R. Clinton Ohlers: *The “Conflict Thesis” of Science and Religion* century with minimal difficulty, notwithstanding initial stirs,<sup>20</sup> those disenchanted with Christianity spied a trend.<sup>21</sup> For them, not only had the *Origin* brought botany and zoology under the scope of natural laws, it did so by bringing together the discrete and the large-scale challenges at one and the same time. Darwin’s theory of evolution, as he articulated it, struck not only at the Genesis account as widely understood, but it also struck decidedly at the classical theistic world-view by bringing divine design into question and seemingly removing direct divine action from the history of life after its first appearance.

In the English-speaking world of science, centered on the Royal Society in England, a group of “Young Turks” chafing under the Anglican establishment were quick to capitalize on the developments of the century’s first sixty years.<sup>22</sup> They are known as the Victorian Scientific Naturalists. Historian of science and religion, Ronald Numbers, has characterized this circle as a “noisy group of British scientists and philosophers led by Huxley and the Irish physicist John Tyndall” who “began insisting that empirical naturalistic science provided the *only* reliable knowledge of nature, humans, and society.”<sup>23</sup> Bernard Lightman explains, “This cluster of ideas and attitudes was ‘naturalistic’ in the sense that it would permit no recourse to causes not empirically observable in nature, and scientific because it drew on three major mid-nineteenth-century theories: (1) the atomic theory of matter; (2) the theory of the conservation of energy; and (3) the theory of evolution.”<sup>24</sup> The Victorian scientific naturalists also embraced a conception of uniformity of nature that entailed natural laws as inviolable.<sup>25</sup> This in itself was a metaphysical assumption, and they defended such an assumed metaphysics as a requirement of true science, a position that had been asserted by the philosopher John Stuart Mill. As I argue elsewhere, all of the elements necessary for a truly naturalized vision of science converged only

20. See, for example, William Whewell, *Astronomy and General Physics: Considered with Reference to Natural Theology* (Philadelphia: Carey, Lea and Blanchard, 1833); and Bradley J. Gundlach, *Process and Providence: The Evolution Question At Princeton, 1845-1929* (Grand Rapids, MI: William B. Eerdmans, 2013).

21. T. H. Huxley had famously written in 1860, in his review of Darwin’s *Origin*, “Extinguished theologians lie about the cradle of every science is the strangled snakes beside that of Hercules,” and he saw this as the historical pattern (Thomas H. Huxley, *Lay Sermons, Addresses, and Reviews* [New York: D. Appleton and Co., 1870], 278.)

22. Frank M. Turner, “The Victorian Conflict Between Science and Religion: A Professional Dimension,” in *Contesting Cultural Authority: Essays in Victorian Intellectual Life* (Cambridge; New York: Cambridge University Press, 1993).

23. Ronald L. Numbers, “Science Without God: Natural Laws and Christian Beliefs,” in *When Science and Christianity Meet*, ed. David C. Lindberg and Ronald L. Numbers (Chicago: University of Chicago Press, 2003), 281.

24. Bernard Lightman, “Victorian Sciences and Religions: Discordant Harmonies,” in *Science in Theistic Contexts: Cognitive Dimensions*, ed. John Hedley Brooke, Margaret J. Osler, and Jitse M. van der Meer, *Osiris* 2nd Series (2001): 346.

25. R. Clinton Ohlers, “The End of Miracles: Scientific Naturalism in America, 1830-1934” (diss., University of Pennsylvania, 2007); Ohlers, *Birth of the Conflict*.

in the 1860s and 1870s and did not become dominant until the end of the century.<sup>26</sup> It is also commonly held that scientific naturalism entails ontological naturalism, asserting “there is no supernatural order above nature.”<sup>27</sup> While such a statement might be true for a later era, it does not describe Victorian scientific naturalism, as will become apparent.

The men who became the Victorian scientific naturalists were more than youths at the turn of 1840. They rose to professional influence and prominence by the 1870s. In 1874 in Great Britain and 1878 in the United States, leading lights among them advanced to the highest level of leadership in the British Association for the Advancement of Science, one of Britain’s two foremost scientific associations, and its transatlantic counterpart, the American Association for the Advancement of Science. John Tyndall’s famous “Belfast Address” of 1874 as president of the BAAS may be considered the premier example of an intended pronouncement of Victorian scientific naturalism as the new standard of scientific reasoning. In the speech, Tyndall employed the conflict thesis between science and religion for the purpose of promoting naturalistic assumptions over supernaturalist ones in a scientists’ approach to nature. He borrowed from the narratives of Draper’s *A History of the Intellectual Development of Europe* and Friederich Lange’s influential *History of Materialism* (1866) to argue that it was not merely ignorance or dogmatism, but theism itself that blocked scientific advance.

Tyndall listed theories of the early Greek atomists of the fifth century B.C. that appeared to anticipate the big three scientific developments that Lightman noted: the renaissance of atomism, the law of the conservation of energy, and the theory of evolution. The atomists’ naturalistic metaphysics epitomized the “radical extirpation of caprice and the absolute reliance upon law in Nature” that, Tyndall proclaimed, “science demands.”<sup>28</sup> After eliminating from the pantheon of Greek natural philosophy thinkers like Socrates, Plato, and Aristotle, who did not fit this model, Tyndall declared that by the second century A.D., “the science of ancient Greece had already cleared the world of the fantastic images of divinities operating capriciously through natural phenomena.”<sup>29</sup> By contrast, the delay until the nineteenth century of these discoveries owed to the influences of Socrates, Plato, Aristotle, and the rise the of Christianity in promoting speculation on final causes and divine intervention in nature. Ironically, in borrowing from Draper, Tyndall often removed the little

26. R. Clinton Ohlers, “Natural Laws and Genesis: A Historical Enquiry,” paper presented at the American Theological Society Annual Meeting, San Antonio, November 2017; Ohlers, *The Birth of the Conflict*.

27. Edward B. Davis and Robin Collins, “Scientific Naturalism,” in *Science and Religion: A Historical Introduction*, ed. Gary B. Ferngren (Baltimore: The Johns Hopkins University Press, 2002), 232.

28. John Tyndall, “Inaugural Address Before the British Association,” *Popular Science Monthly* 5 (August, 1874): 653.

29. *Ibid.*, 656.

nuance that even Draper had allowed. If not fully materialistic, the point of Tyndall’s address was clear: traditional theism was a threat to scientific thinking; naturalistic assumptions were the only valid premises.

As we noted, Tyndall was not alone nor were fellow scientific naturalists limited to Great Britain. In the United States, the American equivalent of Belfast occurred in St. Louis in 1878, where Simon Newcomb delivered his inaugural address as President of the American Association for the Advancement of Science. Newcomb, a mathematical astronomer and Fellow of the Royal Society, echoed Tyndall’s themes. As in Great Britain, the prevalence of Christian theism among Americans during this period was a primary obstacle to belief in nature as closed system of uninterrupted natural laws. The lecture, entitled “The Course of Nature,” directly confronted theistic belief, specifically targeting the doctrine of special providence. In special providence, God employed natural causes to purposefully bring about events that otherwise would not have occurred. The doctrine appeared to many to be compatible with the operation of natural laws.<sup>30</sup> Newcomb intended to disabuse his audience of such a notion. “I have but a single central idea to present to you,” Newcomb announced to his St. Louis audience, “namely, that of the simplicity and universality of the laws of Nature.”<sup>31</sup> That the laws of nature are simple in their design and universal would be taken as a given by nineteenth-century men of science. For Newcomb, “simple” and “universal” were terms he meant to make synonymous with inviolable and uninterrupted or added to. Using the example of a murderer struck dead by a falling rock, Newcomb left no room for God to somehow interfere so that the rock might strike at the right place and time. Either natural causes operated without interference all the way back to the point of initial creation, or there was some point at which the divine intervenes and physically alters the chain of cause and effect. To physically alter the effect of water on the dirt that supports the stone was for Newcomb no different than to physically alter the effect of gravity and launch the rock it into the air.

The central figure in the dissemination of scientific naturalism in America, and of the conflict thesis worldwide, was the scientific lecturer and editor Edward Livingston Youmans (1821-1887). His famous contemporary and biographer John Fiske dubbed Youmans both the nation’s “interpreter of science for the people” and “America’s apostle of evolution.”<sup>32</sup> As the science editor for Appleton’s publishing house, Youmans founded the magazine *The Popular Science Monthly* in 1871. In the years before his death in 1878, Youmans published an array of scientific notables

30. Robert Bruce Mullin, “Science, Miracles, and the Prayer-Gauge Debate,” in *When Science and Christianity Meet*, ed. David C. Lindberg and Ronald L. Numbers (Chicago: University of Chicago Press, 2003), 210.

31. Simon Newcomb, “The Course of Nature: An Address Before the American Association for the Advancement of Science, At St. Louis, August 22, 1878,” *Popular Science Monthly* supplement, 13-18 (1878): 481.

32. John Fiske, *Edward Livingston Youmans, Interpreter of Science for the People a Sketch of His Life* (New York: D. Appleton and Co., 1894), 148.

including virtually every leading Victorian scientific naturalist in the English-speaking world and many from across Europe. Tyndall and Newcomb's addresses appeared in the *Monthly*. It was Edward Youmans who approached Draper in 1873 to write the *History of the Conflict Between Religion and Science* as a popularization of the themes in his earlier *History of the Intellectual Development of Europe* for Youmans' International Scientific Series. Youmans even appears to have recommended its title.<sup>33</sup> While Draper's work was still rapidly selling out printings, Youmans published White's *Warfare of Science* in 1876 in serial form in the pages of the *Monthly* and in book form through Appleton's. Twenty years later, new chapters of White's expansion appeared in the *Monthly*, under the editorship of Youmans' younger brother and longtime collaborator, Jay Youmans. Appleton's again published the work, now two volumes, under a new title.

### III: The Theology of Scientific Naturalism

Given the dominance of Christianity within the English speaking world, as well as the numbers of practicing scientists who were also practicing Christians, it comes as little surprise that Tyndall and Newcomb entangled themselves in controversies that lasted nearly a year after each of their addresses. The physicist and devout Christian, James Clerk Maxwell, known today for Maxwell's equations was particularly critical of Tyndall, as were others.<sup>34</sup> Newcomb, for his part, became embroiled in debate with individuals ranging from Harvard's Asa Gray to Princeton's (then the College of New Jersey) President, James McCosh.<sup>35</sup> What may be more of a surprise is the degree to which Tyndall and Newcomb claimed to approve of "religion." Both relied on Kantian distinctions. Tyndall evaded materialism by asserting that natural processes of nature and of evolution were "the manifestation of a power absolutely inscrutable to the intellect of man."<sup>36</sup> Newcomb also viewed the divine as inaccessible to human senses and limited the rightful place of theology to one of speculation on this inaccessible realm. Whereas Tyndall appears to have been something of a pantheist,<sup>37</sup> Newcomb favored deism whereby there existed only a single moment of divine intervention, so to speak, at the very beginning where the underlying laws by which nature itself operated came into being.<sup>38</sup>

33. Fleming, *John William Draper*, 125.

34. Matthew Stanley, *Huxley's Church and Maxwell's Demon: From Theistic Science to Naturalistic Science* (Chicago: University of Chicago Press, 2014), 189-92.

35. Albert Moyer, *A Scientist's Voice in American Culture: Simon Newcomb and the Rhetoric of Scientific Method* (Berkeley: University of California Press, 1992), 135-45.

36. Tyndall, "Inaugural Address," 682.

37. Ruth Barton, *John Tyndall, Pantheist: A Rereading of the Belfast Address* (Philadelphia: History of Science Society, 1987).

38. Newcomb, "The Course of Nature," 493.



Draper and White, along with Youmans, shared with Tyndall and Newcomb a common outlook on the significance of natural law for divine action in the physical universe and its importance to science. In his *Intellectual Development*, Draper spoke of science as the recognition of “immutable laws” over “the doctrine of arbitrary volition.”<sup>39</sup> In his preface to the *History of the Conflict*, he announced, “We are now in the midst of a controversy, respecting the mode of government of the world, whether it be by incessant divine intervention, or by the operation of primordial and unchangeable law.”<sup>40</sup> Draper and White based their understanding of history on the idea, developed by thinkers such as Hegel, Strauss, Comte, and Spencer, that human civilizations advanced through phases likened to human infancy, adolescence, maturity, and old age. The era of maturity was epitomized by acceptance of modern science of a world governed by natural laws alone. Draper devoted his six-hundred and twenty-three pages to tracing out this pattern in Western history.

White took an approach that would become known as intellectual history. He focused on the development of major branches and sub-branches of the physical and human sciences. In each chapter White traces the development of a different science from belief in the supernatural to the discovery of natural laws. He contrasted belief in “almighty caprice” and with that of “all-pervading law.”<sup>41</sup> The growth of scientific thought overcame men’s explaining “everything by miracle and nothing by law” to explaining all things in the natural and human science by unbending law.<sup>42</sup> Chapter titles emphasized this pattern: “Genesis to Geology,” “The Prince of the Power of the Air to Meteorology,”<sup>43</sup> “From Magic to Chemistry,” “From Miracles to Medicine,” “From ‘Demonic Possession’ to Insanity,” and so forth. Each chapter followed a standard narrative of movement from belief in supernatural causes to discovery and widespread recognition of natural causes resulting from uniform laws. White ended each section with the assertion that the scientific developments had ultimately benefited religious belief.

For Draper, belief in an inviolable system of natural laws promoted true monotheism. His own theological view was that of a pantheistic monism that included a form of immortality of the human soul after death and attributed rationality to the mind of the deity. Both his pantheism and his view of the immortality (if not lasting individuality) of the human soul was connected to the laws of the conservation of energy. Draper writes: “The doctrine of the conservation and correlation of Force yields as its logical issue the time-worn Oriental [i.e., Averroist] emanation

39. Draper, *Intellectual Development*, 3, 13.

40. Ibid., xv.

41. Andrew Dickson White, *A History of the Warfare of Science With Theology in Christendom*, vol. 1 (D. Appleton and Co., 1896), 15.

42. Andrew Dickson White, *A History of the Warfare of Science With Theology in Christendom*, vol. 2 (D. Appleton and Co., 1901), 29, 290.

43. The “Prince of the Power of the Air” is Satan, as described by the Apostle Paul in Ephesians 2:2.

theory” which holds “that a portion of the already existing, the divine, the universal intelligence, is imparted, and, when life is over, this returns to and is absorbed in the general source from which originally came.”<sup>44</sup>

Draper argued that pantheism emerged historically whenever a culture faced the truths of nature. It was Islam that first and most fully exemplified this marriage of monotheism and inflexible natural law in the pantheistic monism of tenth and eleventh-century Averroism. Pantheism represented the reconciliation of religion with science. “Why should we cast aside solid facts presented to us by material objects?” Draper asked. “In his communications throughout the universe with us, God ever materializes. He equally speaks to us through the thousand graceful organic forms scattered in profusion over the surface of the earth, and through the motions and appearances presented by the celestial orbs. Our noblest and clearest conceptions of his attributes have been obtained from these material things.”<sup>45</sup> By contrast, every form of historic Christianity, with its embrace of the Trinity and divine intervention in nature, was a product of pagan superstition.<sup>46</sup>

White was more comfortable with Christian traditions and symbols than was Draper. Deeply influenced by Transcendental Unitarianism in his youth, by the English poet and intellectual Mathew Arnold (1822-1888), and a desire to retain historical Protestant traditions, at least in liturgical form, White’s preferred religious affiliation was with the Episcopalian denomination in which he was raised. His biographer, Glenn Altschuler, reflected that “White was among the rarest of hyphenates, a Parkerite-Episcopalian.”<sup>47</sup> The hyphenation is apt. The Transcendentalist Unitarian Theodore Parker (1810-1860) has been described as a leading figure who influenced the Unitarians away from adherence to the authority of the Bible and belief in miracles, in favor of views compatible with the naturalism of David Friederich Strauss’ *Life of Jesus* (1835). Abhorrent of Calvinistic doctrine as cruel, and famous for promoting moral truths alone as that which is permanent and lasting in Christianity, Parker famously criticized the Church as being more concerned with creeds than with truth.<sup>48</sup> White adopted the same views in his adolescence in Saratoga and during his undergraduate years in New Haven, from where he traveled to hear Parker preach in Boston.<sup>49</sup> Thereby, he arrived at his view of what was essential in true religion,

44. Draper, *History of the Conflict*, 358.

45. Draper, *Intellectual Development*, 579.

46. John William Draper, *Thoughts on the Future Civil Policy of America* (New York: Harper and Brothers, 1865), 200-3.

47. Glenn C. Altschuler, *Andrew D. White - Educator, Historian, Diplomat* (Ithaca, NY: Cornell University Press, 1979), 21.

48. Goodman Russell, “Transcendentalism,” *The Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/archives/sum2017/entries/transcendentalism/> (accessed May 11, 2017); Albert Post, *Popular Freethought in America, 1825-1850* (New York: Octagon Books, 1974), 196; Dean Grodzins, “Theodore Parker,” *Dictionary of Unitarian and Universalist Biography*, <http://uudb.org/articles/theodoreparker.html> (accessed May 11, 2017).

49. White, *Autobiography*, vol. 2, 519ff.

borrowed not from ancient creeds or study of the New Testament but from Mathew Arnold’s<sup>50</sup> description of “a Power in the universe, not ourselves, which makes for righteousness,” and the New Testament admonition for “love of God and of our neighbor.”<sup>51</sup>

Such a conception of God and religion accorded well with his understanding of the relationship between natural laws and science itself as divine revelation. “Modern science,” White explained, “in substituting a new heaven and a new earth for the old—the reign of law for the reign of caprice, and the idea of evolution for that of creation—has added and is steadily adding a new revelation divinely inspired.”<sup>52</sup> This substitution not only imposed new limits on theology, it also met with its own limits relative to religion. These, in turn, established the context for White’s understanding of divine action: for example, in response to prayer. Speaking of worship and prayer, White explains:

If fine-spun theories are presented as to the necessary superfluity of praise to a perfect Being, and the necessary inutility of prayer in a world governed by laws, my answer is that law is as likely to obtain in the spiritual as in the natural world: that while it may not be in accordance with physical laws to pray for the annihilation of a cloud and the cessation of a rain-storm, it may well be in accordance with spiritual laws that communication take place between the Infinite and finite minds; that helpful inspiration may be thus obtained,— greater power, clearer vision, higher aims.<sup>53</sup>

#### **IV: The God of the Gaps**

Given the significant theological implications of their philosophy of science, Victorian scientific naturalists interested in maintaining some version of religion needed not only a scientific apologetic for inviolable natural laws but also a religious apologetic to promote a theology stripped of miracles. That apologetic would famously come to be known as the “God of the Gaps” argument. The argument or, more accurately, objection, states that although many people have looked to find God’s activity in gaps in nature (for example, the origin of life and the origin of its diversity), to do so diminishes God in three ways. First it is claimed, to do so relegates God’s activity to an ever-shrinking realm. This shrinkage occurs as science fills what are believed to be gaps in nature that prove only to be gaps in our knowledge of nature. Following the assumption that all events in the history of the physical universe have natural causes, promoters of the God-of-the-Gaps argument assumed as a given

50. Glenn C. Altschuler, “From Religion to Ethics: Andrew D. White and the Dilemma of a Christian Rationalist,” *Church History* 47, no. 3 (1978): 314.

51. White, *History of the Warfare*, vol. 1, xii.

52. *Ibid.*, 23-24.

53. White, *Autobiography*, vol. 2, 568-69.

that all gaps must be due to ignorance. Second, reflecting an argument voiced by the German philosopher Gottfried Leibniz in the eighteenth century, the objection claims that belief in divine intervention in the natural world made God's creative power appear imperfect, unable to produce a perfectly self-perpetuating system. Third, it is claimed that those who believe in intervention diminish God because they see God's action only in intervention and not in aspects of nature where direct intervention is absent.

Although commonly thought to have originated in the 1890s with the popular evangelist and author, Henry Drummond,<sup>54</sup> an articulate and complete form of the objection appears in 1873 in a lecture by Edward Youmans, entitled "The Religious Work of Science." Youmans delivered the talk at the Cooper Union in New York, the same locale where four years earlier White delivered his "Battle-fields" lecture of 1869. Similarly, Youmans also was associated with the avant-garde of the Unitarians that so strongly appealed to White. In the speech, Youmans narrated a long history of warfare between science and religion. As the solution to the apparent conflict, he recommended an understanding of God consistent with unbroken natural laws and criticized those who looked for evidence of the divine in the "breaches" of nature:

The theologians who claimed to be authorized expounders of the divine policy insisted not only that breaks and interruptions of the natural order occurred, but they maintained that it is in these breaches of it that the Creator is to be most conspicuously and impressively seen. Holding that the normal phenomena are of small concern, while their ruptures alone disclose divine intervention, they left it to the men of science to work out the natural order to its completeness, and to vindicate the Almighty, whose wisdom is witnessed not in the violations but in the perfection of his works.<sup>55</sup>

The argument obtained the more catchy, alliterative term "gaps" in 1894 when it was co-opted into the service of somewhat more mainstream theology by Drummond. A gifted communicator, if somewhat amateur theologian, Drummond was deeply influenced by the apparent support from science for the universe as a system of inviolable natural laws. Drummond complained that, "There are reverent minds who ceaselessly scan the fields of Nature and the books of Science in search of gaps — gaps which they will fill up with God. As if God lived in gaps!"<sup>56</sup> Further:

When things are known . . . we conceive them as natural, on Man's level;  
when they are unknown, we call them divine—as if our ignorance of a thing

54. Thomas Dixon, *Science and Religion: A Very Short Introduction* (Oxford: Oxford University Press, 2008), 45.

55. Edward Livingston Youmans, "The Religious Work of Science," in *Edward Livingston Youmans, Interpreter of Science for the People*, ed. John Fiske (New York: D. Appleton and Co., 1894), 495.

56. Henry Drummond, *Ascent of Man* (New York: James Pott & Co., 1894), 333.

were the stamp of its divinity. If God is only to be left to the gaps in our knowledge, where shall we be when these gaps are filled up? And if they are never to be filled up, is God only to be found in the disorders of the world? Those who yield to the temptation to reserve a point here and there for special divine interposition are apt to forget that this virtually excludes God from the rest of the process. If God appears periodically, he disappears periodically. If he comes upon the scene at special crises he is absent from the scene in the intervals. Whether is all-God or occasional-God the nobler theory? Positively, the idea of an immanent God, which is the God of Evolution, is infinitely grander than the occasional wonder-worker who is the God of an old theology.<sup>57</sup>

Historically speaking, it appears that the God of the Gaps objection originated (or, like the conflict thesis itself, exploded in popularity) only recently, sometime during the specific decades when scientific naturalism placed heightened pressure on Christian belief. In spite of the objection’s claims, Christian theology historically never asserted such a narrow scope for divine action. Rather, the God who was understood to have created the natural order, then continually sustained the existence of the creation, governing through the general providence of natural processes.<sup>58</sup> The divine role in nature was understood alongside special divine action within the created order for the purpose of human redemption in the form of special providences, signs, wonders, miraculous interventions, inspired revelation, divine entrance into the creation in the Incarnation of Christ, and the spiritual transformation of individuals through faith in Christ. The God of the Gaps argument turned historic Christian doctrine on its head by asserting that its expansive view of divine action was a limited one. Counterintuitively, it claimed that its more limited version, in which all divine action in nature was effectively general providence after an initial point of creation, was actually an enlarged vision. Rhetorically, however, the God of the Gaps argument served its purpose. As a response to new pressures, it provided a justification for the marriage of two values that often appeared at odds: the commitment to belief in a closed-system of natural laws and a commitment to religion.

## V. Nexus

The idea of natural laws so inviolable as to preclude divine intervention is a metaphysical one. Although it was limited to nature and made no claim about the ultimate existence or non-existence of God, the idea is nevertheless metaphysical. It is a fundamental statement about the processes of nature that could be neither

57. Ibid., 334.

58. C. John Collins, “How to Think About God’s Action in the World” in *Theistic Evolution: A Scientific, Philosophical, and Theological Critique*, ed. J. P. Moreland, et. al. (Wheaton, IL: Crossway, [forthcoming] 2017); Plantinga, *Where the Conflict Really Lies*, 65-67.

fully observed nor verified. It also implied certain possibilities concerning God's being while excluding others. Given such distinctions, it is helpful to distinguish two categories of metaphysics by suggesting two terms. There is *metaphysics of nature*, which concerns the fundamental nature of the physical universe. Naturalism, for example, is one view of the metaphysics of nature. Then, there is *metaphysics simpliciter*, concerning ultimate reality, which pertains to philosophy of religion and theology and concerns the characteristics of God's being, or ontology. The metaphysics that describes our physical universe also defines, by implication, the kind of God who created that universe. Philosophy of science, therefore, tends to entail metaphysics and, ultimately, philosophy of religion. To discuss this nexus requires, then, a clear distinction between categories of metaphysics: metaphysics of nature and metaphysics *simpliciter*.

Ronald Nash, Chad Meister, and others have pointed out that there exist only a very limited number of potential options for divine ontology—that is, what God's being is like.<sup>59</sup> Further, the universe and reality in which we all exist must conform to one of these. One of these *must* be true. They are: classical theism, deism, pantheism/panentheism, and materialism.<sup>60</sup> Classical theism (henceforth, simply theism) holds that God created the physical universe, sustains it, governs it providentially, and continues to interact with creation by means of special divine action, commonly understood as miraculous intervention (whatever “intervention” actually is).<sup>61</sup> Theism is also the only ontology among these that is incompatible with metaphysical naturalism in the physical universe. Each of the other five can be accommodated to naturalism. In strict deism, for example, divine action ceases after the initial creation. In effect, deism is non-supernatural theism. Pantheism, which envisions the universe and God as one in the same, can take a naturalistic form by defining natural laws as God's laws, that is, part of the divine nature. Baruch Spinoza (1632-1677) exemplified this view. Panentheism, is most simply described as the idea that the universe is part of God, but all of God is not the universe. It is grouped here with pantheism, because in regard to naturalism, it is equally accommodating and does so in essentially the same manner.<sup>62</sup> Materialism is, by definition, ontological naturalism.

59. See, for example, Chad Meister, *Introducing Philosophy of Religion* (New York: Routledge, 2009); William Hasker, *Metaphysics: Constructing a World View* (Downers Grove, IL: InterVarsity, 1989); and Ronald Nash, *Faith & Reason: Searching for a Rational Faith* (Grand Rapids, MI: Academie Books, 1988).

60. Alternatives like polytheism, animism are better seen as subcategories. For example, some forms of polytheism are theistic in that there is a high god and lesser gods, while other forms are pantheistic (e.g., as in Hindu polytheism).

61. Exactly what “intervention” is is a complex topic, as Plantinga points out (Plantinga, *Where the Conflict Really Lies*, 91ff.).

62. To the degree that some theists claim panentheism, they do so in regard to the question of the origin of the substance of the universe, and not in regard to the question of divine intervention. To the degree, for example, which Jonathan Edwards may have been a pantheist (admittedly a controversial question), his view included miraculous divine intervention. By contrast, Arthur Peacocke's panentheism, as noted earlier, excludes miraculous divine intervention.



Therefore, in light of a naturalistic metaphysic of nature, that is, of nature as a closed and impenetrable system of physical laws, all adherents ultimately must depart theism. Nevertheless, such adherents are not required to adopt metaphysical naturalism as their metaphysic *simpliciter*. For this reason, many of the most notorious Victorian scientific naturalists could at one and the same time adhere to a naturalistic metaphysic of nature and also assert theological positions. Thereby, Draper, Tyndall, Youmans and (seemingly) White embraced pantheism, Newcomb deism, and others embraced materialism (atheism). Had the terminology of panentheism arrived before the twentieth century, some may have found a home there.<sup>63</sup>

Such a discussion requires mention of T. H. Huxley, who coined the terms “scientific naturalism” and “agnostic.” The reason for the absence of agnosticism from our list of ontological categories, is that agnosticism is not a statement about ultimate reality. Rather, it is a statement about what can be known or not known about ultimate reality, or about one’s own undecided state of belief. As agnostic as one might be, one of those metaphysic *simpliciter* categories is actually real. It is also worth noting that to be agnostic does not mean that the agnostic must regard all of the ontological categories with equal indecision. Few people today, for example, are agnostic about the existence of Zeus. Huxley was not at all agnostic about classical theism. He rejected it outright.<sup>64</sup>

## VI. The Long Shadow of Scientific Naturalism

The lingering issues of Victorian scientific naturalism that fostered the conflict thesis and determined theological options available to Tyndall, Newcomb, Draper, and White retain their relevance and continue to drive theological options in the present day. Alvin Plantinga’s discussion of the controversy over divine action in *Where the Conflict Really Lies: Science, Religion, and Naturalism* (2011) reveals the degree to which the Victorian-era conflict between science and religion that resulted from its conceptualization of natural laws continues to the present day. Once such a metaphysic of nature is accepted, theological restrictions become unavoidable. Plantinga notes the work of the twentieth-century theologians Rudolf Bultmann, Landon Gilkey, and John Macquarrie, who all rejected the idea of miracles because “breaks” or “interventions” in nature contradicted metaphysical assumptions embedded within modern science. As Macquarrie explained:

Science proceeds on the assumption that whatever events occur in the world can be accounted for in terms of other events that also belong within the world; and . . . the scientific conviction is that further research will bring to

63. Some may deserve to be recategorized as panentheists, but that is beyond the scope of this study.

64. Bernard Lightman, *The Origins of Agnosticism: Victorian Unbelief and the Limits of Knowledge* (Baltimore: Johns Hopkins University Press, 1987), 119ff.

light further factors in the situation, but factors that will turn out to be just as immanent and this-worldly as those already known.<sup>65</sup>

Again we find the naturalistic metaphysic of nature coupled with an epistemological prediction regarding further discovery—the completion of the gaps with acceptable naturalistic answers.

Plantinga attributes this prejudice against miracles to a misunderstanding of Newtonian classical physics and the law of the conservation of energy. “In classical physics,” he points out, “the great conservation laws deduced from Newton’s laws are stated for closed or isolated systems.” Because these principles apply only to closed systems, “there is nothing in them to prevent God from changing the velocity or direction of a particle. If he did so, obviously, energy would not be conserved in the system in question; but equally obviously, that system would not be closed, in which case the principle of conservation of energy would not apply to it.”<sup>66</sup> The significance of the assumption of a closed system applies to more than merely the first law of thermodynamics. It applies to all natural laws. “If God were to perform a miracle,” Plantinga points out, “it wouldn’t at all involve contravening a natural law. That is because, obviously, any occasion on which God performs a miracle is an occasion when the universe is not causally closed; and the laws say nothing about what happens when the universe is not causally closed.”<sup>67</sup> Physical laws “don’t purport to tell us how things always go; they tell us, instead, how things go when no agency outside the universe acts in it.”<sup>68</sup>

The idea of a conflict between science and supernatural religion did not arise from Newtonian physics. As Robert Burns and Peter Harrison demonstrate, the founding members of the Royal Society in the 1660s, along with Newton’s famous contemporary Robert Boyle, and the great majority of its members of the society in the eighteenth century, all worked within the framework of the mechanistic philosophy. They also believed in divine intervention and did not envision the universe as a closed system.<sup>69</sup> Rather, the explicit coupling of classical physics with the idea of the universe as a closed, deterministic system was the work of the French astronomer Pierre-Simon Laplace. Laplace’s idea of the universe as a closed system did not, of course, come from the domain of science. Plantinga cautions, “You won’t find that claim in physics textbooks—naturally enough, because that claim isn’t physics, but

65. John Macquarrie, *Principles of Christian Theology*, 2nd ed. (London: 1977), 248, cited in Plantinga, *Where the Conflict Really Lies*, 71.

66. Plantinga, *Where the Conflict Really Lies*, 78.

67. *Ibid.*, 82-83.

68. *Ibid.*, 79.

69. Robert M. Burns, *The Great Debate on Miracles: From Joseph Glanvill to David Hume* (Lewisburg, PA: Bucknell University Press, 1981), 14, 15, 19ff; Peter Harrison, “Religion, the Royal Society, and the Rise of Science,” *Theology and Science* 6, no. 3 (2008): 255-71.

R. Clinton Ohlers: *The “Conflict Thesis” of Science and Religion* a theological or metaphysical add-on.”<sup>70</sup> In our terms, its domain is the metaphysics of nature.

As Plantinga is aware, there is more to the story than simply a commonplace misunderstanding of the limits of the conservation of energy and other natural laws. John Tyndall, for example, sparred with theologians over the reality of miracles and answered prayers almost a decade before he ignited controversy at Belfast. At least one perceptive opponent criticized Tyndall for falling into a fatal error. He had taken the descriptive principle of uniformity and treated it as prescriptive. He thereby strayed beyond the pale of trustworthy, empirically supported statements into the realm of metaphysics. Rather, than rebut the point, Tyndall turned for support to John Stuart Mill who argued that science could not function if the results of its inductive methods did not apply universally.<sup>71</sup> An oft-repeated quip during that era was that if a single river were discovered to run uphill, science would be impossible. The same reasoning was applied to divine intervention. Science could not work if its conclusions could not apply universally in every instance, and they could not so apply if there were or ever had been a break in its uniform law-like processes. Science, however, did work. Therefore, the uniformity of nature as a descriptor must be assumed to be, or at least treated as being, universal and inviolable. It was universal because the self-confidence of Victorian scientific naturalism required it to be so.

If Tyndall was the Stephen Hawking of his day, Hawking, in respect to his metaphysics and philosophy of science, is no less the John Tyndall of our day. In his most recent book, *The Grand Design* (2010), Hawking reflects, “the scientific determinism that Laplace formulated is the modern scientist’s answer to [the] question of [miracles]. It is, in fact, the basis of all modern science. . . . A scientific law is not a scientific law if it holds only when some supernatural being decides not to intervene.”<sup>72</sup>

For examples of contemporary theologians working in the area of science and religion who reject the possibility of divine intervention, Plantinga points to the Divine Action Project (DAP), a series of conferences and publications from 1988 to 2004, whose participants included over fifty prominent philosophers, theologians, and scientists. Three DAP objections to miracles claim: 1) an alleged inconsistency in that divine intervention occurs sometimes and not in response to every incidence of evil; 2) that if any natural regularity is contravened in any instance, human decision making, which relies on predictable patterns of cause and effect, would be undermined and, with it, free will also; 3) for God to act in two ways in the natural order, at once supporting regular and consistent natural laws while at the same time breaking those laws would amount to divine inconsistency.<sup>73</sup> Of the three, the second most closely

70. Plantinga, *Where the Conflict Really Lies*, 79.

71. Mullin, “Science, Miracles, and the Prayer-Gauge Debate,” 207-9.

72. Stephen Hawking and Leonard Mlodinow, *The Grand Design* (New York: Bantam, 2010), 30.

73. Plantinga, *Where the Conflict Really Lies*, 97ff.

approximates Tyndall's objection on the basis of the predictive nature of science. While each of these three objections is theological, they share an obvious cultural advantage in conforming to the dominant vision of science that Hawking describes. They display, as Plantinga observed, "a decided list in the Laplacean direction."<sup>74</sup> It is, in fact, difficult to imagine a group of leading theologians, among whom rejection of miraculous divine intervention was the majority view, convening anytime before the waning years of the nineteenth century.

Almost all the DAP participants agree that only a noninterventionist account of divine action is acceptable. Describing what that looks like is the challenge. Arthur Peacocke evaded the difficulty through panentheism and process theology. Peacocke's critique of one such noninterventionist scenario might equally be said of all classically theistic attempts at noninterventionist divine action: whether we perceive it or not, God directly influences the system and therefore *intervenes*.<sup>75</sup> If God effects results within our physical universe that would not have occurred through His preservation alone, then He is in some way acting upon the universe to effect physical change. Although natural properties<sup>76</sup> and their resulting laws may not be interrupted, since processes can only be said to be interrupted if a system is causally closed, intervention, in the sense of direct action appears unavoidable.

Recognition of the influence of Victorian scientific naturalism in shaping present-day discussions may help inform current discussions of the relationship of science to divine action. One evangelical scholar currently at work in these areas is the physicist and theologian Lydia Jaeger, Academic Dean at the *Institut Biblique de Nogent-sur-Marne*, in France. Another is James Stump, Senior Editor at BioLogos, author of *Science and Christianity: An Introduction to the Issues* (2017) and co-editor, among others, of *Science and Christianity* (2012). Both Jaeger and Stump support belief in the miracles of the Old and New Testaments as philosophically sound.<sup>77</sup> Both also accept at least the theoretical possibility that God may have intervened in natural history to bring about certain natural structures.<sup>78</sup> In addition, Jaeger views miracles as occurring "without, above, or against natural means" so that by definition, a miracle "escapes any scientific account."<sup>79</sup> Stump follows Alvin Plantinga's assertion that the

74. Ibid., 105.

75. Ibid., 97-98.

76. On "natural properties" as a more important concept than "natural laws" (which owe to natural properties), see C. John Collins, "How to Think About God's Action in the World," (forthcoming).

77. Lydia Jaeger, "Against Physicalism-Plus-God: How Creation Accounts for Divine Action in Nature's World," *Faith and Philosophy* 29, no. 3 (2012): 11-13; James Stump, panelist, "A Conversation on Origins: BioLogos, Reasons to Believe (RTB), and Southern Baptists," Evangelical Theological Society Annual Meeting, San Diego, CA, November 2014.

78. Personal conversation, June 16 and 17, 2017, The Dabar Conference, Deerfield, IL, June 14-17.

79. Jaeger, "Against Physicalism-Plus-God," 12-13.

miracles pose no contradiction to natural laws when the universe is recognized as an open system.<sup>80</sup>

Their discussion of science and divine action becomes potentially problematic, however, in their critique of Robert Russell’s Noninterventionist Objective Divine Action (NOIDA). In the following passage, Jaeger attempts to rally the God of the gaps objection against NIODA and the suggestion of a causal joint at the level of quantum mechanics:

Trying to fit divine action into the gaps in the scientific description clearly shows a confusion of primary and secondary causes: God is not an additional causal factor alongside the entities that populate the world. His action is therefore not in competition with the established natural order; it is manifested just as much in his providential sustaining as it is by a miracle, should one occur. Looking for “gaps” in the picture which science gives us, and invoking God to explain them, is more deistic than theistic.<sup>81</sup>

Stump cites Jaeger’s gaps critique of NIODA and marshals it against NOIDA and the Intelligent Design movement, also. Stump explains:

Some Christians seem to find succor in these supernatural interventions, believing them to keep God involved in the affairs of the world. In reality, though, putting God into the gaps in the natural explanations is already a concession to the deism they are trying to avoid. . . . There is not much difference between the deistic god who started things off and then sits back and watches and the Intelligent Design god who sits back and watches for a while then inserts himself into the process for a bit to make something work to then go back to sitting and watching.<sup>82</sup>

Further, Stump alleges that NIODA suffers not only from the gaps objections, but that such a view is fundamentally dichotomized. “Either nature is left to itself to produce a certain effect,” Stump objects, “or God does something to change the way nature would have gone. This is one of the difficulties of attempting to locate God’s action within the causal order discovered by science.”<sup>83</sup>

Such attempts to appropriate the God of the gaps objection to the interests of biblical Christianity suffer from a number of shortcomings. First, they fail to clearly distinguish real Deism or semi-Deism from traditional Christian theology, which contemplates special divine action occurring in the events of creation after the initial starting point: the origins of life and human consciousness are two examples. By such

80. James Stump, *Science and Christianity: An Introduction to the Issues* (Oxford: Wiley Blackwell, 2017), 125.

81. Lydia Jaeger, *What the Heavens Declare: Science in the Light of Creation* (Eugene: Cascade Books, 2012), 93.

82. Stump, *Science and Christianity*, 53.

83. *Ibid.*, 128.

reasoning, an expansive view of divine action that includes special divine action in nature's past is counted as deistic and as a diminishment of divine action, whereas the more limited set is considered non-deistic and construed as an enlargement of divine action. The polemic is the same as that of the late Victorian era, but modified with the epithet of deism and the appeal to avoid it.

Second, such objections go beyond questions of the scope and limits of scientific method to instead assert how God must act in regard to nature and natural processes. Therefore, it is unclear why the critique must not logically also apply to other forms of divine action that involve natural processes such as special providence, the efficacy of Christian prayer, or accounts of spontaneous healing preceded by prayer, or to biblical miracles. Relevant here is the promising scholarly work on miraculous healings in Christianity by Candace Gunther Brown and Craig Keener, particularly to the degree that such reports are medically documented and thereby involve scientific disciplines.<sup>84</sup>

For such objections to be constructive, greater clarity concerning how divine healing of a physical human body does *not* make God “an additional causal factor alongside the entities that populate the world” in a way to which Jaeger objects. Similarly, it is not immediately clear how cases of divine healing avoid Stump's concern if “God does something to change the way nature would have gone” or how such events can possibly *not* “locate God's action within the causal order discovered by science.” Rather, such objections appear to stand at odds with the intellectual goal of a comprehensive understanding of science, natural laws, and all aspects of divine action.

An illustration from a BioLogos post by Stump highlights the difficulty. In “Belief in God in a World Explained by Science,” Stump addresses the question of retaining faith in Christ should science fill in every gap in the created order with a natural explanation. He points out that regardless of explanations of the natural order, Christian religious experience remains compelling. Stump recounts how Carl Sagan's film *Contact* (1997) deeply strengthened his faith while a graduate student in Boston. In the film, Jodie Foster plays a SETI researcher named Ellie Arroway. In the course of interstellar journey lasting many hours, Dr. Arroway makes contact with alien intelligence. On her return, she learns that only 8 seconds transpired on Earth and that NASA believes her transport never left the planet. No physical evidence to confirm her story exists. A congressional hearing ensues over what appears to be an outrageously expensive hoax, and the lead investigator pressures Arroway to recant.

84. Candy Gunther Brown, ed., *Global Pentecostal and Charismatic Healing* (New York: Oxford University Press, 2011); Craig Keener, *Miracles: The Credibility of the New Testament Accounts* (Grand Rapids, MI: Baker Academic, 2011); Candy Brown, *Testing Prayer Science and Healing* (Cambridge, MA: Harvard University Press, 2012).



Ellie not only refuses, but *cannot* do so. “The weight of her own experience won’t allow it.”<sup>85</sup>

It is fair to point out that the film *Contact* also offers a valuable example of the intellectual limits of the God of the Gaps objection and its disruptive influence on the pursuit a full understanding of divine action. In a climactic scene in the conclusion of the film it is revealed that, unbeknownst to Arroway or the rest of the world, a confidential government report on the experiment includes mention of eighteen hours of static that was somehow recorded during her eight-second event. In other words, not all the evidence had been admitted to the inquiry. Certainly, Jodie Foster’s character is fully justified in believing her own experience. But that is just it, *only* she is fully justified. Third parties, particularly undecided, open minded, and rational ones require something more, even if just an inconclusive hint unexplainable within the opposed framework. The film’s authors recognize that fact and provided that detail.

A significant intellectual problem with the God of the Gaps objection is that cuts off, prematurely and *a priori*, the search for those “18 hours of tape.” The ability to conduct such a search was at the heart of the controversy over Victorian scientific naturalism. If it is a valuable exercise to consider how belief in God would function in a universe entirely explained in naturalistic terms, then it is also a valuable exercise to examine whether the universe, the origin and diversity of life, consciousness, and modern accounts of special divine action that overlap with and even require scientific enquiry, might objectively demonstrate evidence by which they fail to be explainable in purely naturalistic terms. The move from denying the right of the former exercise to denying the right of the latter one was a central assertion in the conflict thesis and central tenet of Victorian scientific naturalism.

## Conclusion

Andrew Dickson White recognized keenly what was at play when he retitled *The Warfare of Science* as *The History of the Warfare of Science with Theology in Christendom*. With *theology* in *Christendom* was exactly where the conflict lay. The challenges to Christianity during the first sixty years of the nineteenth century were of two types: discrete and large-scale. Christian theologians accommodated both. However, to the individuals who would one day become the Victorian scientific naturalists, several of the large-scale challenges appealed as evidence for a metaphysic of nature based on belief in inviolable natural laws. That metaphysic was engendered largely by an incomplete view of the law of the conservation of energy. Nevertheless, it informed the Victorian scientific naturalists’ metaphysic *simpliciter* concerning divine ontology. Therein lay the fuse for the explosion of the popularity

85. James Stump, “Belief in God in a World Explained By Science, Part 1,” *BioLogos*, <http://biologos.org/blogs/jim-stump-faith-and-science-seeking-understanding/belief-in-god-in-a-world-explained-by-science-part-1> (accessed 5/25/2017).

of the conflict thesis in the last quarter of the nineteenth century. Of the ontological options recognized in philosophy of religion, classical theism, deism, pantheism/panentheism, and materialism, Victorian scientific naturalism eliminated theism alone and embraced the others.

Contrary to widespread belief, the scientific naturalists of the Victorian era maintained their own theological views, which they selected from the pool of options that allowed for both belief in God and their naturalistic metaphysics of nature. Pantheism and deism were the choices for those who did not favor materialism or resign themselves to agnosticism. If the two leading Victorian scientific naturalist physicists, Tyndall and Newcomb, the two authors of the modern conflict thesis, Draper and White, and the greatest popularizer of both, Edward Youmans, all favored pantheism or deism, one wonders how prevalent materialism and agnosticism really were within that movement. When Draper and White wrote of conflict, they also held out hope that readers would, like themselves, find the path of reconciliation with religion by embracing pantheism or deism.

The scientific naturalism of the late Victorian period also engendered anew a theological polemic deployed against classical theism: the God of the Gaps objection. Historically speaking, the God of the Gaps objection was problematic on multiple grounds. On the one hand, it directed itself at a view of God that may never have existed in any significant sense, and very certainly was not held by the Christian theologians and laity against whom it is deployed. Only by excising significant categories within the historical Christian theology concerning divine action could it serve as a polemic against traditional conceptions of special divine action within the process of Creation. The objection appears also to be of very recent mintage. Its roots were not in historic Christian theology or biblical exegesis, but rather in a confidence in the all-encompassing power of natural laws coupled with the metaphysical add-on of a closed system of physical causes. It was that self-same overweening confidence and metaphysical add-on that gave Victorian scientific naturalism its impetus and propelled the popularity of conflict thesis of science and religion. Rhetoric to the contrary notwithstanding, the effect of the God of the Gaps objection both at the time of its origin and in its present-day deployment has been to justify that diminishment and make it emotionally palatable.

As we have seen, in the work of Plantinga, Jaeger, and Stump, certain salient features of Victorian scientific naturalism and the conflict thesis it promoted remain central to the discussion of science and religion today, including the longstanding popularity of the God of the Gaps objection and the desire to separate accounts of divine action from the causal order investigated by science, even while the metaphysics and universal claims of scientific naturalism are rejected. Better understanding of that history and the logic by which the conflict thesis formed at the nexus of philosophy of science, metaphysics, and philosophy of religion should enlighten the contemporary

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discussion. Greater clarity, it is hoped, will offer new foundations for thought as the discussion moves forward informed by historic patterns.

## ***Responding to Perceived Theological Implications of Evolutionary Creation***

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**Abstract:** In this article I will respond to several common arguments against the position known increasingly as evolutionary creation. I consider an argument that evolution undermines the gospel itself, and other *reductio ad absurdum* arguments about human uniqueness, divine action, and the problem of evil. These are not technical arguments from academic literature as much as more popularly held views that I encounter regularly in churches and other places speaking to lay audiences about evolution and the Christian faith. Here I attempt to lay out the logic of these arguments (which is often more felt than articulated) and show where they can reasonably be opposed.

**Key Words:** evolutionary creation, theistic evolution, evolution, sin, human uniqueness, divine action, miracles, problem of evil

In this article, I will attempt to defend the position of evolutionary creation against what are often perceived to be untenable theological implications of the position. I will not offer evidence or arguments here for the science of evolution, but proceed via the conditional, “if evolution is true. . . .” As a prelude to that, I will first defend the terminology of “evolutionary creation” (EC) over against the more broadly used (broadly in two senses) label of “theistic evolution.”

Historian of science, Edward B. Davis, traces the use of “theistic evolution” back to at least 1877 and the Canadian geologist John W. Dawson in his book *The Origin of the World, According to Revelation and Science*.<sup>1</sup> The term has been used widely (one of my senses of “broad”) by both opponents and proponents of the idea that God has had something to do with the process of evolution. But the “something to do with” clause is capable of such broad interpretation (my other sense of the term), that many of us today want to be more specific in the position we adopt. Consider the similarity between apologetic defenses of bare theism versus a defense of robust and Christocentric Christianity. It might reasonably be thought that focusing on the more

1. Ted Davis, “Science and the Bible: Theistic Evolution, Part 1” BioLogos Blog (August 15, 2012) <http://biologos.org/blogs/ted-davis-reading-the-book-of-nature/science-and-the-bible-theistic-evolution-part-1>.

general case is easier to defend. But I am persuaded in the case of apologetics that it was the neglect of the specificity of Christian theism that opened the door for challenges to the “god of the philosophers.”<sup>2</sup> So too in the case of theistic evolution, I think it is wise to focus on the more narrowly defined “evolutionary creation” as there are specifically Christian responses to some of the challenges to generic theism.

The label “evolutionary creation” has increasingly been used by those who believe in the creator God of the Judeo-Christian tradition as articulated in the creeds (e.g., I believe in God the Father almighty, creator of heaven and earth).<sup>3</sup> We evolutionary creationists believe that God is the creator, and are unwilling to cede the term to those who deny the science of evolution.

Furthermore, “theistic evolution” is a curious and confusing conflation of terms. Does anyone talk about “theistic photosynthesis”? There are plenty of Christians who believe God superintends the process of photosynthesis, and yet do not seem to feel the need to qualify their acceptance of it with “theistic.” And they do not feel the need to inject miraculous divine action into the chemical equation of photosynthesis in order to preserve God’s role. The issue is that the equation, while complete as a scientific description, does not tell the whole story. I affirm theologically that it is perfectly legitimate to say that God provides food for plants to grow and flourish. In our total understanding of reality, we must take that into account just as much as (or perhaps even more than) the scientific description of how plants make food. So too, as an evolutionary creationist, I affirm theologically that God is the creator—even that God intentionally created human beings; and I affirm that evolution is the best scientific description we have for how that happened over time. Evolution does not tell the whole story, but provides one important perspective; theology does not tell the whole story either, but provides an important perspective. If we want to know the whole story, we must take account of both, and allow them to be in dialogue with each other.

I will return to this point below when considering the topic of divine action. I give the teaser here to explain why I call myself an evolutionary creationist, and turn now to defending this position against several common attacks.

Some people object to EC for reasons of biblical literalism: the Bible says Adam and Eve were created on the sixth day; the days were 24 hour periods; we can calculate when those days occurred by adding up the genealogies; therefore, evolution could not have happened. In my experience of interacting with Christian laypeople about science and the Bible, a version of that argument is deeply embedded in many of them because it is believed to be the most supportive of a “high” view of Scripture. It is curious, then, that none of the premises to that argument are actually literal readings of Scripture, and it is sometimes deeply troubling to people to realize that there are

2. See William Buckley, *At the Origins of Modern Atheism* (New Haven, CT: Yale University Press, 1987) for a full defense of this claim.

3. Denis Lamoureux was an early adopter of the label. See his *Evolutionary Creation* (Eugene, OR: Wipf & Stock, 2008). Now BioLogos explicitly promotes evolutionary creation.

multiple layers of interpretation required to sustain their “literal” reading of Scripture.<sup>4</sup> There are exegetical arguments from Scripture against evolutionary creationism that deserve consideration, but I am not professionally trained to respond to these with much authority. I am a philosopher (with some training in theology too), and so want to engage the objections as such.

My full-time work with BioLogos brings me into regular contact with Christian laypeople who are concerned that EC has dire theological implications, and therefore they believe the science of evolution must be rejected. We also hear consistently (though not quite as much as the first group) from science-minded skeptics who are quite sure that evolution has shown traditional Christian theism to be false. There are four areas of theological concern that come up over and over with evolutionary creation in these conversations:

1. The origin of sin and the need for a savior
2. Human uniqueness and the image of God
3. Divine action and deism
4. The problem of evil and the goodness of God

I am going to frame each of these topics as an argument against evolutionary creation. Each will have a central premise (or more precisely, a string of premises) that is an if-then statement, beginning with “If evolution is true. . . .” It is interesting to note that skeptical critics and evolution-denying Christian critics use the same chain of reasoning to object to EC. Skeptics use it for *modus ponens* arguments, accepting the antecedent of the conditionals and claiming that orthodox theological claims have in fact been undermined by evolution; Christian critics use it for *modus tollens* arguments, claiming that the rejection of the unorthodox consequents of the conditionals force us to reject the antecedent “evolution is true.”<sup>5</sup> I’ll attempt to show that there are points in the chain of reasoning where the asserted entailments can plausibly be denied. That means proponents of EC can accept the antecedent “evolution is true” without having to accept the problematic theological conclusions critics claim follow from evolution. It will also be seen that different people within the EC camp might object at different points in the string of conditionals.

4. For example, Adam and Eve are not mentioned in Genesis 1 where the six-day account is given; there is no mention of hours in Genesis 1 (and not even a sun for the first three days by which their length might be measured); and there are assumptions that must be made about the genealogies to get all the numbers required for the calculation (and it is not clear genealogies in the ancient Near East were intended to function this way).

5. Regarding the technical terminology, *modus ponens* arguments have a premise of the form “If A is true, then B must be true” as their first premise, and then the second premise is the claim “A really is true.” That generates the conclusion “B really is true.” *Modus tollens* arguments have the same first premise, but the second premise is the claim “B is false” which generates the conclusion “A is false.” For the conditional premise “If A then B”, whatever is in the A position is called the antecedent, and whatever is in the B position is called the consequent.



## 1. Sin and the Need for a Savior

The first topic I will consider involves the conceptual territory of Adam and Eve, original sin, and the need for a savior. Here is one way the central chain of reasoning can go:

If evolution is true,  
    ↳ then we didn't all descend from just two people;  
        ↳ and so there is no Adam and Eve;  
            ↳ and then we couldn't have inherited original sin;  
                ↳ so there is no need for a savior.

Of course there is a real concern for Christians here at the end of the chain of reasoning. Jesus Christ as the savior of the world is absolutely central to the Christian faith. If a line of reasoning leads us to believe that Christ's saving work is somehow not necessary, that can be taken as a *reductio ad absurdum* argument (or when the implied premises are supplied, a *modus tollens* argument). When the reasoning of the chain of implications is accepted, that means the starting point—evolution is true—must be denied by faithful Christians. Skeptics accept the starting point as obviously true, and accept the chain of reasoning, and therefore assert that our faith has been undermined. But does this really follow? Can we accept the starting point, but not be pulled through to the conclusion? I think we can.

Yes, if evolution is true, then we did not all come from just two people. But I am not so sure this next link follows. There are some defenders of evolutionary creation who think that Adam and Eve are symbolic and not historical individuals.<sup>6</sup> But there are others who accept the science of evolution and still think there are ways of holding to a literal pair that is consistent with science and with Scripture. Denis Alexander details several possibilities in his *Creation or Evolution: Do We Have to Choose?*<sup>7</sup> He himself thinks a representative model of Adam is most plausible according to which God entered into a relationship with two individuals some 10,000 years ago (among the thousands living at the time), and they served as representatives for all of humanity. There are other options for a real Adam and Eve who were representatives of all humanity, and even some models according to which Adam and Eve were ancestors of all humanity (though not the sole progenitors of all humanity).<sup>8</sup> Genetic science has shown persuasively (through multiple independent lines of evidence) that the genetic diversity we find in humans today could not have come from just two people living six

6. See, for example, Denis Lamoureux's contribution to *Four Views on the Historical Adam*, ed. Caneday and Barrett (Grand Rapids, MI: Zondervan, 2013).

7. Denis Alexander, *Creation or Evolution: Do We Have to Choose?* Revised and expanded (Oxford: Monarch Books, 2014).

8. Alexander details five different models for understanding Adam and Eve in *Creation or Evolution*, chapter 10.

to ten thousand years ago.<sup>9</sup> But genetics cannot comment on whether God entered into a relationship with two people and treated them as representatives for all.

The next step in the argument is even more tenuous when it is tied to evolutionary science. The assertion seems to be that our sinful condition is passed through lines of biological inheritance. But does anyone really think now that sin is literally passed on through the mechanism we know to be responsible for biological inheritance—DNA? If so, we now have the technological ability to edit DNA through the CRISPR technology,<sup>10</sup> so if we could just identify which sequence of nucleotides corresponds to that inherited sin nature, we could once and for all rid the human race of original sin! That is a seriously faulty concept of original sin if it leads to such consequences. Instead, we must acknowledge that all humans sin—that is the biblical affirmation. It may be difficult to say exactly when sin entered the human race on evolutionary terms, and there is rigorous and helpful exploration of this now.<sup>11</sup> But it is not controversial at all to say that as a matter of fact sin did enter the human race. We all sin. None of us doubts that. Our inability to tell all of our species' history in detail does not prevent us from understanding our current condition. Consider if you were out hiking and came across an injured dog: you could tell immediately that help is needed without knowing exactly how the dog came to be injured. So too, it is painfully obvious that we all sin, so we need a savior. Understanding our natural history in evolutionary terms does not prevent us from affirming the reality of our salvation history.

## **2. Human Uniqueness and the Image of God**

Another concern people often have about the implications of evolutionary science is regarding our status as unique among all creatures, and what that means for the theological doctrine of the image of God. The argument might go as follows:

If evolution is true,

↳ then we have common ancestry with other forms of life;

↳ and then we cannot say exactly when human life began;

↳ so we are no different than other animals;

↳ and therefore we cannot bear the image of God.

9. See chapter three in Dennis Venema and Scot McKnight, *Adam and the Genome: Reading Scripture after Genetic Science* (Grand Rapids, MI: Baker Books, 2017). See also Eugene E. Harris, *Ancestors in Our Genome: The New Science of Human Evolution* (Oxford: Oxford University Press, 2015).

10. A good introduction to CRISPR can be found at the Broad Institute website: <https://www.broadinstitute.org/what-broad/areas-focus/project-spotlight/questions-and-answers-about-crispr>

11. The 2016 Theology Fellows at BioLogos each wrote about sin from the perspective of evolutionary creation. Their posts can be found at: <http://biologos.org/blogs/guest/2016-theology-fellow-posts/>. Also look for the forthcoming book: Chad V. Meister and J. B. Stump, eds., *Five Views on Original Sin and the Fall* (Downers Grove, IL: InterVarsity, forthcoming 2018).

Once again, the first step is indisputable according to our current understanding of evolution. Pick any two people, and if you go back far enough in their family trees, you'll come to ancestor from which they both descend. Evolution predicts that the same is true of any two individual life forms: for a human and a chimpanzee, the common ancestor is about 6 million years ago; for a human and a fish, it is about 420 million years ago; for a human and a fern, it is about 1.35 billion years ago.<sup>12</sup> Does this mean we cannot say exactly when human life began? Some people affirm we cannot. It is problematic in the biological sense to say that one generation of non-humans suddenly gave birth to little human beings. It just does not work that way. The boundary lines between species are blurry.

We can look at the fossils of our ancestors and say with some degree of confidence that those older than three or four hundred thousand years ago were not us; and we can say with some confidence that those more recent than one hundred thousand years ago are anatomically just like us. But so much of what makes us human is not preserved in the fossil record. Theologically, some people might assert that there was a definitive break, a time when God breathed his breath into those *Homo sapiens* and made them fully human. The fossil record does record a fairly dynamic influx of symbolic activities starting around fifty thousand years ago (cave paintings, jewelry, decorations, etc.). Were these the result of our becoming "truly human"? Some scholars, like J. Wentzel van Huyssteen, see tremendous theological significance in this period of the emergence of "behaviorally modern" human beings.<sup>13</sup> Other scholars argue that evidence for a sudden burst of new behaviors is less than compelling and that the emergence of modern human behavior was more gradual.<sup>14</sup>

So some evolutionary creationists agree that we cannot say exactly when human life began; some do accept that uncertainty as an implication of evolution. Even if we agree, must we accept the next claim in the chain of reasoning, viz., that we are no different than other animals? I do not think this follows. Among those with an atheistic axe to grind, it is not uncommon to hear claims about humans being just another animal—a hairless ape, or tailless monkey. And Darwin himself in his later work attempted to show that even our cognitive abilities—as remarkable as they are compared to any other animal—differ only in degree, not in kind, from other animals:

The difference in mind between man and the higher animals, great as it is, certainly is one of degree and not of kind. We have seen that the senses and intuitions, the various emotions and faculties, such as love, memory, attention, curiosity,

12. A fun, interactive web page showing lineages and calculating generations and years to last common ancestors with human beings is: <https://www.evogeneao.com/explore/tree-of-life-explorer>.

13. See J. Wentzel van Huyssteen, *Alone in the World? Human Uniqueness in Science and Theology* (Grand Rapids, MI: Eerdmans, 2006).

14. For example, John Shea, "Homo sapiens is as Homo sapiens was: Behavioral Variability versus 'Behavioral Modernity' in Paleolithic Archaeology," *Current Anthropology*, 52(1) (2011): 1-35.

imitation, reason, etc., of which man boasts, may be found in an incipient, or even sometimes in a well-developed condition, in the lower animals.<sup>15</sup>

The gap once seemed to be a temporary deficiency of our own knowledge and it would be only a matter of time until we filled it in with a smooth continuum of abilities; now it seems to be more definitive. One does not have to invoke theology to argue for human uniqueness these days, as one recent book puts it:

A hundred years of intensive research has established beyond reasonable doubt what most human beings have intuited all along; the gap is real. In a number of key dimensions, particularly the social realm, human cognition vastly outstrips that of even the cleverest nonhuman primates.<sup>16</sup>

There is a very strong case to be made for human uniqueness from a host of disciplines—and often with non-Christian scholars as the leading voices.<sup>17</sup> There is a remarkable difference in kind between us and other animals, not just a difference of degree. The tricky and often misunderstood part of this response is that the capacities that set us apart (morality, reason, language, culture, and so on) are dependent upon other components of behavior and our brain structures, and these things do have evolutionary stories. So we find hints or precursors of them in other species. But the story of how we came to be does not determine the kind of thing we are.

Finally for this topic, even if someone were to go all the way down the chain of reasoning and accept that we are not different in kind than other animals, that does not force them to accept that we are incapable of bearing the image of God. There is much theological discussion about what it means to bear God's image. Some theories depend on the kind of capacities we have, and so if our capacities are not really that different than other animals, then we could not justifiably claim the image of God to the exclusion of other species. But other understandings of the image of God are relational. That is to say, we bear the image because God chose us; God entered into a relationship with us. Presumably there are some necessary capacities for God choosing us (I am not claiming God could have chosen cucumbers to bear his image). But even if there are other species (whether extant or extinct, on Earth or elsewhere in

15. Charles Darwin, *The Descent of Man*, Chapter IV ("Comparison of the Mental Powers of Man and the Lower Animals--continued"), in *The Origin of Species and The Descent of Man* (New York: The Modern Library, 1936), 494-95.

16. Kevin Laland, *Darwin's Unfinished Symphony: How Culture Made the Human Mind* (Princeton, NJ: Princeton University Press, 2017), 14.

17. Examples of non-Christian scholars who defend human uniqueness: from paleoanthropology, Ian Tattersall, *Becoming Human: Evolution and Human Uniqueness* (New York: Harcourt, 1998); from neuroscience, Terrence Deacon, *The Symbolic Species: the Co-evolution of Language and the Brain* (New York: W. W. Norton & Company, 1997); from philosophy, Raymond Tallis, *Aping Mankind: Neuromania, Darwinitis and the Misrepresentation of Humanity* (London: Routledge, 2016); from biology, David Sloan Wilson, *Evolution for Everyone: How Darwin's Theory Can Change the Way We Think about our Lives* (New York: Bantam Dell, 2008); and from psychology, Michael Tomasello, *A Natural History of Human Thinking* (Cambridge, MA: Harvard University Press, 2014).

the universe) that have those minimally required capacities, one could still make the case we and we alone bear God's image because we were elected to do so. This does not differ in its justification from the theological position that God elected Abram, or that some people are predestined and others are not. It could be a matter of God's will that we bear his image and others do not, rather than a matter of our own merit.

Again, different people within the camp of EC will find different jumping off points of this chain of reasoning most plausible. They need not all agree on just where that point is in order to be unified in their assessment that the science of evolution does not present an insurmountable problem for affirming the theological doctrine that humanity was created in God's image.<sup>18</sup>

### 3. Divine Action and Deism

Next, as I alluded in my introduction, there is often a problem for people in understanding how God's intentional action can be accounted for in scientific theories. The fear is that if we have scientific explanations for things, then God is no longer needed to explain that part of reality. Increasing scientific knowledge seems to paint God into a smaller and smaller corner. An argument expressing that sentiment might be the following:

If evolution is true,  
    ↳ then there are random elements to the development of life;  
        ↳ that means God does not guide or direct the process;  
            ↳ and then there are no miracles;  
                ↳ so we're stuck with a distant and  
                    uninvolved God (deism).

In evaluating this chain of reasoning, we should start by saying that if evolution is true, then it is true from the perspective of science that there are random elements to the development of life. Part of my response to this argument is to show that science is one perspective—not the only perspective. So some theological traditions (though not my own) could merely assert that God determines every facet of our world, and therefore evolution does not include any randomness in reality, just an epistemological randomness because of our inability to know all things. They deny the very first step of this chain of reasoning.

But many evolutionary creationists would accept that evolution entails some random elements to the development of life. Does that mean God cannot guide or direct the process? I do not think that follows, especially since we recognize that even we lowly humans can direct some random processes like lotteries and other games

18. Worth reading on this topic to get an overview of and orientation to the different approaches to theological anthropology is the article by Joshua M. Moritz, "Evolutionary Biology and Theological Anthropology," in *The Ashgate Research Companion to Theological Anthropology*, ed. Joshua R. Farris and Charles Taliaferro (Farnham, UK: Ashgate, 2015).

of chance. Casinos do remarkably well at turning a consistent profit on the random outcomes of their games. Could it not be the same for God and evolution? No one is claiming that every aspect of evolution is random, just that there are some random elements—like when and where a mutation occurs in the transcription of genetic code.<sup>19</sup> Perhaps there are enough parameters built into the system (like the rules of casinos' games of chance) that over the long term, there are certain outcomes that are inevitable. Simon Conway Morris has earned a reputation for defending a version of convergent evolution according to which if we replayed the development of life, we would end up with very similar kinds of organisms.<sup>20</sup>

That is one interesting line of inquiry about divine action, but there is a slightly different concern many people have with scientific explanations with respect to divine action: if we have a scientific explanation (like random genetic mutations plus natural selection), then God must not be involved. That quickly leads to concerns about miracles in general and the fear that if you do not invoke God's special action to create human beings, then there are no grounds for believing in the resurrection. And if you believe in God at all after that, it could only be the God of deism who sits back and watches everything go on its own without any intervention.

But that view of divine action is seriously deficient, as it seems to imply a strict "either-or" between God's special, miraculous action on the one hand, and the natural workings of things on the other. It is a laudable impulse to keep God involved in our explanations, but when divine action is asserted only at the expense of there being no natural explanation, we set ourselves up for diminishing theological returns. This setup implies that God is not involved in phenomena for which we have natural explanations. Does God not cause the sun to rise, or knit us together in our mother's womb? On this understanding, we would have to say no. And that means we are already practically deists or episodic deists, because as Aubrey Moore noticed in the late nineteenth century, "a theory of occasional intervention implies as its correlative a theory of ordinary absence."<sup>21</sup>

The key to seeing the problem with this reasoning is to recognize that scientific explanations are limited, that they do not tell the whole story. The best illustration of this

19. Some people even claim that perhaps God is causing the right mutations to occur in order to keep things evolving the way he intends for them to develop, but that God is able to do this beyond the ability of science to detect his action. For example, Robert J. Russell, "Quantum Physics and the Theology of Non-Interventionist Objective Divine Action," in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton (Oxford: Oxford University Press, 2006).

20. See Simon Conway Morris, *Life's Solution: Inevitable Humans in a Lonely Universe* (Cambridge: Cambridge University Press, 2003).

21. Aubrey Moore, *Science and the Faith: Essays on Apologetic Subjects*, 6th ed. (Kegan Paul, Trench, Trübner & Co., 1905), 184.



is still the one John Polkinghorne made famous about the boiling teakettle<sup>22</sup>: if we come into a room and see a kettle boiling, we might ask for an explanation: why is the kettle boiling? A scientist in the room might say that the electrical circuit was closed which caused electrons to flow through the heating element, which conducted heat to the kettle, which increased the kinetic energy of the water molecules, causing the vapor pressure of the liquid to exceed that of the surrounding atmosphere. That is a fine explanation, and in no part of it do we say, “and then a miracle happens.” So we understand the natural process very well. But it does not tell the whole story of what is going on in that room. For someone else there might answer our question, “Why is the kettle boiling?” with “because I wanted a cup of tea.” That personal explanation addresses a different dimension of reality, and it is not invalidated when we learn the scientific explanation of the process. We just have a better, bigger understanding of reality.

In the same way, I think it is perfectly legitimate to say theologically (a kind of personal explanation) that God created me in his image, that he knit me together in my mother’s womb—even though we also understand the natural explanation for how I came to be. So just as we know the scientific story of how each of us as individuals came about, and that does not negate the theological dimension of God’s involvement, neither should the scientific story of how our species came about negate the theological dimension of God’s involvement in that process.

#### 4. The Problem of Evil and the Goodness of God

Finally, we get to this last topic, and for many people this is the most difficult one. But it does not seem like the success or failure of EC should be pinned to whether it can answer the problem of evil to everyone’s satisfaction—since no other position has done that. Still, we want to be able to say something about this problem. Consider this framing of the problem:

- If evolution is true,
  - ↳ then created things have been dying since the very beginning;
  - ↳ so creation could not have been very good;
  - ↳ that means God is responsible for evil;
  - ↳ and therefore God is not good.

There is a picture of creation many people have according to which the “very good” creation means everything was originally perfect and nothing was dying—not even

22. Polkinghorne’s first published use of this example appears to be in “Is Science Enough?” *Sewanee Theological Review*, 39 (1995): 11-26. It should be noted, however, that Alister McGrath claims in his *The Big Question* (New York: St. Martin’s Press, 2015), 44 the teakettle example first came from geologist (and then president of Cornell University) Frank H. T. Rhodes in his “Christianity in a Mechanistic Universe” in *Christianity in a Mechanistic Universe and Other Essays*, D.M. MacKay, ed. (Downers Grove, IL: InterVarsity Press, 1965), 42.

the organisms of the microbiome, on some accounts.<sup>23</sup> That picture bears little resemblance to the overall scriptural narrative, which must take account of God's provision of food for predators (Ps 104:21) and for creating monsters like leviathan (Job 41). Perhaps it is argued that these pertain only to the post-Fall creation. But then we can point to Genesis 1, where there is no hint of a Fall: God creates the humans, then commands them to be fruitful and multiply, to fill the earth and subdue it. After that, God calls the situation "very good". This must mean that God did not create things originally the way he intended for them to be. He could have snapped his fingers and made a world that was already filled and subdued, but he did not do that. Instead he created us and instructed us to do it.

If God created things such that they needed subduing, but even in that condition were called "very good", it seems that God delights in the process of things coming to be what he wants them to be. So we can affirm that God ultimately intends for death to be defeated, while accepting that the world was not originally created in that condition, even though it was very good. I think that point alone stops this argument from reaching its conclusion, but I think we can say something more positive about how the EC position can treat the problem of evil, suggestive though it may be.

The evolutionary struggle is often criticized as involving needless pain and suffering. But that point seems often overblown as a critique unique to evolution. Evolution does not require death and suffering; it only requires variation among offspring and a selection mechanism that gives an advantage to some offspring for reproducing. Yes, some individual organisms die painful deaths on the evolutionary account; they do on non-evolutionary accounts as well. The fact that many more do on evolutionary accounts than on versions of natural history that appeal to the special creation of species, seems to be merely a function of the fact that there are many more creatures that live and die over the span of evolutionary time (hundreds of millions of years). That is often called "wastefulness" by opponents of EC, but we might just as well call it the lavishness and extravagance of God's creation. Our understanding of the cosmos and all it contains has continued to reveal the unbelievably vastness of what God has made. That is consistent with the evolutionary account according to which many, many more things have been allowed to exist and to reflect God's glory in their unique ways.

I think it is important to look at the fallenness and difficult parts of creation with eschatology foremost in our minds. It is not orthodox theology to claim God is looking to save us in order to whisk us off to some far away heaven that is unconnected to this created order. If that is what he wanted, he could have just made that from the start. Instead, he has saved us so we might function as we were intended to: as his image bearers and rulers in his kingdom now and in the new heavens and the new earth that

23. For example, Alan Gillen, "The Wonderfully Made Design of the Skin and Its Microbiome," last modified July 16, 2014, accessed May 31, 2017, <https://answersingenesis.org/human-body/wonderfully-made-design-skin-and-its-microbiome/>.

are to come. And thus the grand narrative of salvation history should be seen as one in which God has embarked on a project of shaping us to be who he wants us to be. This applies to us as individuals, as each of us has a story of our spiritual journey to tell. But it seems appropriate to me to say as well that God has shaped us as a species—call it the spiritual journey of *Homo sapiens*.

Perhaps there is an argument analogous to the free will defense here. Perhaps the process of evolution is the only way to develop moral beings like us. Maybe it cannot be done for us. Maybe God can no more snap his fingers to create morally mature creatures than he could create free persons who are incapable of sin. These are contradictions in terms. We become morally mature only by being involved in our own moral formation, by making decisions with moral implications; and this requires challenging environments where decisions have serious consequences. So perhaps our species' capacity for moral responsibility was forged from processes that included pain. This is not senseless pain and gratuitous violence; but consistent with the cruciform nature of creation, it is ultimately redemptive, as God transforms all of creation—even the hard parts—and from the beginning has been working all things together for good. The Christian hope is not in some fabled, perfect past; but in the transformed future, the new heavens and the new earth, the kingdom of God.

And pushing the speculative nature of this exercise even further, perhaps there is an eschatological dimension for creatures beyond humans. Keith Ward says, "Immortality, for animals as well as humans, is a necessary condition of any acceptable theodicy."<sup>24</sup> Such sentiments are not just the post-Darwinian innovations of liberal theologians. John Wesley also thought there might be a place for non-human animals in the afterlife. He said,

May it not answer another end; namely, furnish us with a full answer to a plausible objection against the justice of God, in suffering numberless creatures that never had sinned to be so severely punished? they could not sin, for they were not moral agents. Yet how severely do they suffer! . . . but the objection vanishes away if we consider that something better remains after death for these creatures also; that these likewise shall one day be delivered from this bondage of corruption, and shall then receive an ample amends for all their present sufferings.<sup>25</sup>

This is not some sort of simplistic "all dogs go to heaven" claim, but rather the suggestion that it is fitting with a view of God's justice that all creatures have a place in the Kingdom of God according to their kinds.

24. Keith Ward, *Rational Theology and the Creativity of God* (Cleveland, OH: Pilgrim, 1982), 201.

25. John Wesley, "The General Deliverance" in *The Works of John Wesley*, 3rd ed., Vol. 6 (Grand Rapids, MI: Baker, 1998), 251.

I do not pretend to have solved the problem of evil. Now we see through a glass darkly. But I think such suggestions show that EC has the resources to grapple with it as least as well as other positions.

### **Conclusion**

I have tried to give some flavor of the kinds of theological concerns many people have with evolutionary creation. Some scholars might object that the arguments as I have presented them here are just strawmen. I invite such objectors to spend some time fielding questions about the topic at evangelical churches (or in online forums). These are real concerns that real people have, and they deserve careful and sympathetic responses. All of us benefit from hearing them and working through responses to them.

I want to affirm with critics of EC—particularly with my brothers and sisters in Christ—that it is good to be concerned about theology. I do not take these issues lightly, but neither do I take the testimony of the created world lightly. And when it so clearly says evolution is real, we have got to allow that to be in dialogue with our theology. It seems to me that a result of that dialogue will be a greater understanding of the truth both in theology and in science.

# ***Divine Action and the World of Science: What Cosmology and Quantum Physics Teach Us about the Role of Providence in Nature*<sup>1</sup>**

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**Abstract:** Modern science has revealed a world far more exotic and wonder-provoking than our wildest imaginings could have anticipated. It is the purpose of this essay to introduce the reader to the empirical discoveries and scientific concepts that limn our understanding of how reality is structured and interconnected—from the incomprehensibly large to the inconceivably small—and to draw out the metaphysical implications of this picture. What is unveiled is a universe in which Mind plays an indispensable role: from the uncanny life-giving precision inscribed in its initial conditions, mathematical regularities, and natural constants in the distant past, to its material insubstantiality and absolute dependence on transcendent causation for causal closure and phenomenological coherence in the present, the reality we inhabit is one in which divine action is before all things, in all things, and constitutes the very basis on which all things hold together (Colossians 1:17).

## **§1. Introduction: The Intelligible Cosmos**

For science to be possible there has to be order present in nature and it has to be discoverable by the human mind. But why should either of these conditions be met? Albert Einstein (1879-1955) famously remarked that “the eternal mystery of the world is its comprehensibility. . . . [t]he fact that it is comprehensible is a miracle.”<sup>2</sup> If there were no sufficient cause explaining why the universe exists, if it were taken as a brute fact, there would indeed be no reason to expect the universe to be ordered, let

1. This essay is a synthesis of ideas I have discussed more extensively in other places; I thank the anonymous reviewers for comments that have improved the cohesion of the narrative. For a more complete treatment of various concepts discussed here, please see various articles of mine mentioned in subsequent footnotes.

2. Albert Einstein, “Physics and Reality,” *Ideas and Opinions* (New York: Crown Publishers, 1954), 292. Originally published in *The Journal of the Franklin Institute* 221, no. 3 (1936).

alone for that order to be amenable to the human mind.<sup>3</sup> Of course, if the universe we inhabit is the product of the mind of God, there need be no mystery here. In the Judeo-Christian worldview, nature exists and is regular not because it is closed to divine activity, but because (and *only* because) *it is the operative product of divine causality*. It is only because nature is a creation and thus *not* a closed system of causes and effects that it exists in the first place and exhibits the regular order that makes science possible. And this order is amenable to the human mind because we are created in the image of God with the capacity to understand. God's existence and action are not, therefore, an obstacle to science; rather, they provide the very basis of its possibility.<sup>4</sup>

It is all very well to state this, but it is hardly compelling if there is no evidence that our universe has originated and operates by the action of a particular providence. So *does* the reality we inhabit bear the hallmarks of transcendent intelligent causation, and *does* scientific investigation lead us to its discovery? In a word, yes. It is the purpose of this essay to show how the evidence from cosmology and quantum physics

3. These themes are explored ably in the following works: James Beilby, ed., *Naturalism Defeated? Essays on Plantinga's Evolutionary Argument Against Naturalism* (Ithaca: Cornell University Press, 2002); William Lane Craig and J. P. Moreland, *Naturalism: A Critical Analysis* (New York: Routledge, 2000); Stewart Goetz and Charles Taliaferro, *Naturalism* (Grand Rapids, MI: Eerdmans, 2008); Bruce L. Gordon, "The Rise of Naturalism and Its Problematic Role in Science and Culture" *The Nature of Nature: Examining the Role of Naturalism in Science*, Bruce L. Gordon and William A. Dembski, eds. (Wilmington: ISI Books, 2011), 3-61; Bruce L. Gordon, "In Defense of Uniformitarianism," *Perspectives on Science and Christian Faith* 65, no.2 (2013): 79-86; C. S. Lewis, *Miracles: A Preliminary Study* (New York: Macmillan, 1947, repr. 1960); Ronald Nash, "Miracles and Conceptual Systems," in *In Defense of Miracles: A Comprehensive Case for God's Action in History*, ed. R. Douglas Geivett and Gary Habermas (Downers Grove, IL: IVP Academic), 115-31; Alvin Plantinga, *Warrant and Proper Function* (New York: Oxford University Press, 1993); Alvin Plantinga, "Against Materialism," *Faith and Philosophy* 23, no. 1 (2006): 3-32; Alvin Plantinga, "Evolution versus Naturalism," in *The Nature of Nature: Examining the Role of Naturalism in Science*, ed. Bruce L. Gordon and William A. Dembski (Wilmington: ISI Books, 2011), 137-51; Alvin Plantinga, *Where the Conflict Really Lies: Science, Religion, and Naturalism* (New York: Oxford University Press, 2011); Michael Rea, *World Without Design: The Ontological Consequences of Naturalism* (New York: Oxford University Press, 2002); and Mark Steiner, *The Applicability of Mathematics as a Philosophical Problem* (Cambridge: Harvard University Press, 1998).

4. Gordon, "Rise of Naturalism," 3-61; Gordon, "Uniformitarianism," 79-86; Bruce L. Gordon, "Intelligibility of the Universe," in *Dictionary of Christianity and Science*, ed. Paul Copan *et al* (Grand Rapids, MI: Zondervan), 387-89; Bruce L. Gordon, "The Necessity of Sufficiency: The Argument from the Incompleteness of Nature," in *Two Dozen (or so) Arguments for God: The Plantinga Project* (Oxford: Oxford University Press, forthcoming 2017); Alvin Plantinga, *Where the Conflict Really Lies: Science, Religion, and Naturalism* (Oxford: Oxford University Press, 2011).



enables us to infer it.<sup>5</sup> Our discussion of cosmology will start with the Big Bang and the implications of the universe having an absolute beginning in the finite past, then consider the efforts of quantum cosmologists to mitigate this conclusion, why these efforts fail, and the parallel evidence for design inherent in their proposals. This will lead into a brief discussion of the ways in which the fine-tuning of the universe for life—inclusive of its initial conditions, law-like regularities, and natural constants—is reflective of intelligent causation and how further efforts by theoretical cosmologists to obviate this fine-tuning both fail and undermine scientific rationality in the process. In short, current attempts to obviate the conclusion that the universe had an absolute beginning and is intelligently fine-tuned for the existence of life create conditions under which probabilistic reasoning falters and *anything* that could happen does happen—ininitely many times.<sup>6</sup> The third section of the essay will move from the physics of the very large to that of the very small, considering quantum theory and its description of the behavior of reality at the atomic and subatomic levels. We will find that quantum phenomena—which encompass physically incompatible states in superposition, the nonlocalizability of single quanta, and instantaneous correlations that, on pain of experimental contradiction, have no physical explanation—are incompatible with the reality of material substances<sup>7</sup> and, furthermore, that there is an objective indeterminacy in the operation of the physical universe that is indicative of its causal incompleteness. It is not quantum mechanics that is incomplete, as Einstein once argued, but rather what we call “physical reality” itself. We will also see that the metaphysical incompleteness of “physical reality” entails two things, namely

5. A similar discussion may be had in biology, but it lies beyond the scope of this essay. For readers interested in this subject, I recommend the following works: Douglas Axe, *Undeniable: How Biology Confirms Our Intuition that Life is Designed* (San Francisco: HarperOne, 2016); William A. Dembski, *The Design Revolution: Answering the Toughest Questions about Intelligent Design* (Downers Grove, IL: InterVarsity, 2004); William A. Dembski and Jonathan Wells, *The Design of Life: Discovering Signs of Intelligence in Biological Systems* (Dallas: The Foundation for Thought and Ethics, 2008); Bruce L. Gordon and William A. Dembski, eds., *The Nature of Nature: Examining the Role of Naturalism in Science* (Wilmington: ISI Books, 2011); Stephen C. Meyer, *Signature in the Cell: DNA and the Evidence for Intelligent Design* (San Francisco: HarperOne, 2009); Stephen C. Meyer, *Darwin’s Doubt: The Explosive Origin of Animal Life and the Case for Intelligent Design* (San Francisco: HarperOne, 2013); Jonathan Wells, *The Myth of Junk DNA* (Seattle: Discovery Institute Press, 2011); Thomas Woodward and James Gills, *The Mysterious Epigenome: What Lies Beyond DNA* (Grand Rapids, MI: Kregel, 2012).

6. Max Tegmark, “Infinity is a Beautiful Concept—And It’s Ruining Physics,” in *This Idea Must Die: Scientific Theories that are Blocking Progress*, ed. John Brockman (New York: Harper Perennial, 2015), 48-51.

7. There is a weaselly kind of materialism that tries to adjust the content of the thesis that “all is matter” again and again when a once-favored account of what it means for something to be a material object is rendered untenable by the progress of physical theory. The disingenuous character of this retrenchment strategy is made plain in materialism’s confrontation with quantum physics, however, since there are no sufficient criteria by which to identify and individuate the fundamental constituents of “material” reality in quantum theory, and no sustainable notion of material substance. See Bruce L. Gordon, “A Quantum-Theoretic Argument against Naturalism,” in *The Nature of Nature: Examining the Role of Naturalism in Science*, ed. Bruce L. Gordon and William A. Dembski (Wilmington: ISI Books, 2011), 179-214.

that: (1) the regularity of nature, while mathematically describable, has no physical explanation; and (2) since the principle of sufficient reason—the requirement that every contingent event must have an explanation—is foundational to the practice of science and necessary for both metaphysical coherence and the avoidance of an extreme skepticism, when no physical explanation is possible for why one event rather than another occurred, a metaphysical explanation must be forthcoming. This metaphysical explanation comes in the form of God’s active providential governance of the universe’s day-to-day operation: the quantum-mechanical probabilities for observing certain outcomes are neither more nor less than *ceteris paribus* counterfactuals of divine freedom, that is, objective expressions of the probability that God will act in a certain way to produce the natural phenomena we observe, all other things being equal.<sup>8</sup> In short, there is no such thing as secondary causation providing order to a world of created material *substances*: quantum mechanics reveals the Thomistic view of divine providence to be untenable. The inanimate natural world is not now, nor has it ever been, metaphysically substantial in a way that would provide a foothold for secondary causation; it is wholly and completely, at every instant of its being, a free phenomenological construct of divine causality that incorporates, accommodates, and provides the metaphysical background for the free

8. It is worthwhile noting that Lydia Jaeger, drawing on the work of Peter Mittelstaedt, has argued that the objective indeterminacy of quantum outcomes is such that “not even an omniscient Being can know it, nor can an omnipotent Being (or anybody else) influence or change it. The indeterminacy is objective and does not provide any room for divine action without violating the quantum mechanical laws” (Lydia Jaeger, “Against Physicalism-Plus-God: How Creation Accounts for Divine Action in Nature’s World,” *Faith and Philosophy* 29, no. 3 (2012): 298; see also Lydia Jaeger, *What the Heavens Declare: Science in the Light of Creation* [Eugene, OR: Cascade Books, 2012], 90-93; J. B. Stump has repeated and popularized this claim in his *Science and Christianity: An Introduction to the Issues* [Malden: Wiley-Blackwell, 2017], 128). While it is true that quantum indeterminacy is *physically* objective and so there is no local fact of the matter to be known about quantum outcomes before they are observed—and supposing there is leads to Bell inequalities that the relevant quantum system will then violate—this does *not* entail that it is *metaphysically* impossible for God to create quantum outcomes *as they happen* in a way that maintains the validity of quantum-mechanical descriptions. Jaeger’s mistake—inherited from those she is criticizing—is to assume that quantum mechanics describes the indeterministic behavior of a *substantial* material reality created by God to function in accordance with *secondary causation*, God himself being the primary cause (see Jaeger, *What the Heavens Declare*, 93). But God is *not* acting in the causal gaps of a secondary-causal structure; rather, divine causality *constitutes* the moment-by-moment reality of any and all quantum phenomena, *tout court*. And it could not be otherwise, for as we shall see in what follows, there is no substantial material reality compatible with quantum-mechanical description that could instantiate and sustain secondary causality, and Jaeger’s view would also require God to create a universe in which the principle of sufficient reason was false, which leads to metaphysical absurdity as well as science-destroying skepticism. In particular, if it were possible for contingent events to happen without any explanation, i.e., without a sufficient cause, then the contingent event constitutive of the universe as a whole might be one of those things, and God would not be necessary to explain its existence. It seems strange at best to think that God could, let alone would, create conditions that imply his existence is optional. And of course, if it can be the case that there is no sufficient reason why one thing happens rather than another, your current perception of reality and its accompanying memories may be happening for no reason at all, so the world you think you are experiencing may not even exist. How would you know?

choices and actions of the finite minds God places within it. If that does not grab your attention, nothing will. I trust these claims have whet your appetite for the details and arguments to follow, so let us begin.

## §2. Cosmology and the Evidence of Divine Action

Contemporary scientific cosmology begins with Albert Einstein, whose 1915 theory of general relativity replaced the theory of gravity developed by Isaac Newton (1642-1727). Gravitational forces affect the structure of the universe on scales both small and large, and one of the things that bothered Einstein about Newton's theory was that gravitational force, for Newton, acted *instantaneously* across any distance, no matter how great. For example, in Newton's theory, the motion of the planets around the Sun in our solar system has an immediate (though very weak) gravitational effect on the opposite side of the universe. Such action-at-a-distance had always been controversial, but in 1905 Einstein had shown in his special theory of relativity that the speed of light was the limiting velocity in the universe at which any physical cause could have an effect, so he knew that Newton's theory needed to be modified. General relativity fixed the problem. In Einstein's theory, the presence of matter had gravitational effects that change the structure of spacetime around it as gravitational waves ripple outward from massive objects at the speed of light. The physicist John Wheeler succinctly summarized the situation by saying that, in general relativity, matter tells spacetime how to curve and spacetime tells matter how to move.<sup>9</sup> In this way, Einstein succeeded in eliminating the instantaneous action-at-a-distance that was part and parcel of Newton's theory, and the modern study of the universe was born.

### Big Bang Cosmology and the Origin of the Universe

Big Bang cosmology—the currently accepted model for the beginning of the universe—has its theoretical basis in general relativity, which predicts that space itself is expanding and therefore, if we were to reverse the direction of time, would be contracting. In both special and general relativity space and time are not separate entities, but rather mathematically fused into a four-dimensional structure: spacetime. As Roger Penrose and Stephen Hawking showed in the late 1960s, no matter which general-relativistic model of our universe is chosen, every temporal path backward through spacetime leads to a beginning point in the finite past—a singularity, to use the technical term—from which not just matter and energy, but spacetime itself, emerged. This coming into existence of the universe from *nothing* (no space, no time, no matter, no energy, and hence no physical laws either) is, as the agnostic astronomer

9. John Archibald Wheeler, *Geons, Black Holes, and Quantum Foam* (New York: Norton & Company, 2000), 235.

Robert Jastrow once observed, startling evidence for the doctrine of creation *ex nihilo*. He famously put it this way

For the scientist who has lived by his faith in the power of reason,<sup>10</sup> the story ends like a bad dream. He has scaled the mountain of ignorance; he is about to conquer the highest peak; as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries.<sup>11</sup>

Having grasped that Big Bang cosmology implies a cause for physical reality that transcends the universe, the natural question to ask is what evidence there is for its truth.<sup>12</sup> The first evidence for it came in the late 1920s when the American astronomer, Edwin Hubble, discovered that there were countless galaxies outside our own Milky Way and the light we receive from them is stretched toward the red end of the light spectrum. What is more, the farther away these galaxies are, the greater the shift in wavelength toward the red. This means that these galaxies are moving away from us at great speed and the farther away they are, the faster they are receding from us. But if the universe is flying apart as time moves forward, then if time were moving backward, the universe would be coalescing back into the singularity from which it emerged. The observed expansion rate of the universe allows us to calculate how much time has elapsed since the Big Bang: the currently accepted figure is that the universe is 13.7 billion years old. This is not the only evidence for the Big Bang, however. As the physicist George Gamow demonstrated in 1948, one of the predictions of the theory is the existence of gravitational ripples and cosmic microwave background (CMB) radiation that are “echoes of Creation”, as it were, permeating the whole universe. The CMB was discovered in 1965 by Robert Wilson and Arno Penzias, earning them a Nobel Prize. Gravitational waves are much subtler and have just recently been reported to have been detected—though this result is still being subjected to critical scrutiny—but their existence is not doubted. A final prediction of the Big Bang, calculated by Gamow’s graduate student, Ralph Alpher, was the relative abundance of the lightest elements (hydrogen and helium) in the universe. The existence of the heavier elements is explained by their formation through nuclear fusion in stars and their subsequent dispersion when those stars explode as supernovae. But the existence of the lightest elements has no explanation beyond the Big Bang itself, which predicts their relative abundance quite accurately. In short, Big Bang cosmology is well-confirmed, justifiably believed, and points to a moment of creation that implies a Creator.

10. Jastrow might better have said “faith in the sufficiency of material explanations” because the inference from the *ex nihilo* generation of the universe to a transcendent intelligent cause is eminently reasonable.

11. Robert Jastrow, *God and the Astronomers* (New York: Norton & Company, 1978), 116.

12. For an account of the controversy that once surrounded the model, see Helge Kragh, *Cosmology and Controversy: The Historical Development of Two Theories of the Universe* (Princeton: Princeton University Press, 1996).

This triumph of evidence and explanation gives us a good understanding of the universe back to the time right after the strong force, which holds the nucleus of the atom together, separated from the electroweak force (between  $10^{-32}$  and  $10^{-12}$  seconds after the Big Bang), but physics before this point is *highly speculative*. All physics breaks down at a singularity, and since quantum effects in the gravitational field should manifest at sizes smaller than the Planck length ( $10^{-35}$  meters)—which was the size of the observable universe *prior* to the Planck time of  $10^{-43}$  seconds—this era in universal history (from 0 to  $10^{-43}$  seconds) is known as the *Planck Epoch*. Speculations pertaining to this epoch form a branch of theoretical physics known as *quantum cosmology*, work in which is largely pursued by theoreticians uncomfortable with the idea that the universe had a beginning that physics cannot explain, a situation they attempt to obviate by applying quantum descriptions to the earliest stage of the universe under the assumption that a coherent quantum treatment of the gravitational field (i.e., a theory of quantum gravity) will someday be discovered.

Before we discuss the severe limitations and fine-tuning inherent in quantum cosmological models, let me round out the discussion of universal origins by outlining the origin of the four fundamental forces of nature (strong, weak, electromagnetic, and gravitational). Immediately following the Planck Epoch is the *Grand Unification Epoch*, which extends from about  $10^{-43}$  seconds to  $10^{-36}$  seconds. In this epoch, the symmetries that unified the four fundamental forces spontaneously started to break as energy levels dropped, and gravity separated from the other three forces. It is then conjectured that the separation of the strong nuclear force from the electroweak unification of the two remaining forces (electromagnetism and the weak force, which accounts for radioactive decay) catalyzed a period of exponential cosmic expansion (the subject of inflationary cosmology) that lasted from around  $10^{-36}$  to  $10^{-32}$  seconds and distributed radiation and matter (the latter in the form of a quark-gluon plasma) relatively uniformly throughout the size of the observable universe (which at this point was a volume ranging in size from 10 centimeters to a meter in diameter, depending on the parameters of the inflationary model). It is from this point in the history of the universe that the well-understood physics of the Standard Model and Big Bang cosmology takes over. In other words, *prior* to  $10^{-32}$  seconds after the actual beginning of the universe, speculative models abound and testable assumptions are few and far between. We begin our discussion of these speculative models with a brief examination of quantum cosmology before moving on to discuss the assumptions used to extend the observational basis of cosmology to the global structure of the universe, the fine-tuning it exemplifies, and the problematic ways in which theoretical cosmologists have tried to eliminate this fine-tuning.

## Quantum Cosmology

The most famous quantum cosmologist is Stephen Hawking, who popularized his approach to the subject in the best-selling book *A Brief History of Time*.<sup>13</sup> In this book, he gave a popular account of the “no-boundary proposal” he developed with another physicist, James Hartle. We cannot go into detail here,<sup>14</sup> but let me briefly list some problems with the model in light of its intended goal of erasing a beginning to time. *First*, it presumes we have a consistent quantum theory of gravity. We do not, and if someday we do, it may not fit with the Hartle-Hawking approach. *Second*, the proposal makes essential use of the many-worlds interpretation of quantum theory (something we will discuss in section three below), a highly contentious viewpoint with the bizarre implication that there are countless realities parallel to our own with exponentially more coming into existence every second. *Third*, the proposal involves using a mathematical transformation that changes the structure of spacetime to make the equations solvable. While the transformation eliminates the singularity at the beginning of time—one of the goals of quantum cosmology—this singularity reappears when the mathematical trick is reversed so that the model describes the spacetime of our universe. So Hawking’s famous question “What place, then, for a Creator?”<sup>15</sup> predicated on a universe with no beginning, falls completely flat on two counts: first, when the transformation is reversed, as it must be if the solution is to describe our reality, the universe *does* have a beginning; and secondly, even if, mathematically speaking, the universe did *not* have a beginning, it would still be something *with highly contingent properties* and so would require an explanation for its existence. In such case, the best explanation would seem to be God himself as the timeless and necessarily existent transcendent cause of a contingent universe with no temporal beginning.<sup>16</sup>

A *fourth* problem, as quantum cosmologist Alexander Vilenkin has rightly observed, is that “an observational test of quantum cosmology does not seem possible. Thus . . . quantum cosmology is not likely to become an observational science.”<sup>17</sup> The

13. Stephen W. Hawking, *A Brief History of Time: From the Big Bang to Black Holes* (New York: Bantam, 1988).

14. For a technical critique, see Bruce L. Gordon, “Balloons on a String: A Critique of Multiverse Cosmology,” in *The Nature of Nature: Examining the Role of Naturalism in Science*, ed. Bruce L. Gordon and William A. Dembski (Wilmington: ISI Books, 2011), 558-601, especially pages 563-69. For a more accessible discussion, see Bruce L. Gordon, “Cosmology, Contemporary,” in *Dictionary of Christianity and Science*, ed. Paul Copan *et al* (Grand Rapids, MI: Zondervan), 124-27 and John Lennox, *God and Stephen Hawking: Whose Design Is It Anyway?* (Oxford: Lion Hudson, 2011).

15. Hawking, *Brief History of Time*, 141.

16. Robert C. Koons, “A New Look at the Cosmological Argument,” *American Philosophical Quarterly* 34 (1997): 171-92; Alexander Pruss, “Leibnizian Cosmological Arguments,” in *The Blackwell Companion to Natural Theology*, ed. William L. Craig and J. P. Moreland (Oxford: Blackwell, 2009), 24-100.

17. Alexander Vilenkin, “Quantum Cosmology and Eternal Inflation” (2002), accessed June 29, 2017, <https://arxiv.org/pdf/gr-qc/0204061v1.pdf>.



idea of a “scientific” conjecture being forever beyond observational testing should give us pause. *Fifthly*, given that one of the purposes of quantum cosmology is to avoid finely-tuned physical models describing the beginning of the universe, it fails spectacularly. The no-boundary proposal requires an infinite winnowing (fine-tuning) of mathematical structures to get its technical machinery off the ground, establish the right relationship between matter variables and the curvature of space, and render the geometry of our universe probable (typical) within its description. In short, the reality we inhabit turns out to be very special indeed, which brings us, *sixthly* and lastly, to Hawking’s most lucid question: “What is it that breathes fire into the equations and makes a universe for them to describe?”<sup>18</sup> The fact that one can write down a mathematical equation does not mean that any physical reality corresponds to it, and abstract entities like mathematical equations have no causal powers of their own. So even if quantum cosmological descriptions were correct—and there is no accessible physical evidence that could ever indicate they are—the reality they describe would *still* require a transcendent explanation, and the model itself would *still* embody finely-tuned parameters that point to a transcendent intelligent cause.

### **Observational Astronomy and Extrapolations to the Global Structure of the Universe**

Before considering other aspects of cosmology suggestive of an intelligent cause and the efforts by various contemporary cosmologists to avoid this implication, we need to reflect for a moment on how what we *can* see (the observable universe) is used to make inferences about what we *cannot* see (the global structure of the whole universe). The equations of general relativity have a perplexing variety of solutions, each representative of different spacetime geometries with different global properties. Since the speed of light is the limiting signal speed in the universe, we only ever have access to information about our *local* part of spacetime—the “past light cone” within which light has had time to reach us since the beginning of the universe—and, while the equations of general relativity decree a specific *local* relationship between spacetime geometry and the distribution of matter and energy, there are no *global* constraints that would warrant an inference, on the basis of our local observations, to a “best” model for the global structure of the universe.<sup>19</sup> Furthermore, even within our local environment, the current wisdom is that explaining what we see using general relativity requires attributing ninety-six percent of the mass-energy density of the universe to new entities that cannot be seen directly (“dark matter” and “dark energy”), the existence of which is inferred from its alleged gravitational effects. This inference is based, however, on assumptions and extensions in accepted theories that can be questioned, raising the possibility that some alternative gravitational theory

18. Hawking, *Brief History of Time*, 174.

19. John Manchak, “Can We Know the Global Structure of Spacetime?” *Studies in History and Philosophy of Modern Physics* 40 (2008): 53-56.

could explain what we can see *without* invoking new kinds of matter and energy that we cannot see.<sup>20</sup>

In regard to the nature of the universe beyond our horizon of observability, is there any basis on which claims regarding its global structure can be made? In order to apply general relativity to the universe as a whole, Einstein assumed something called the *cosmological principle*: on large scales, spacetime geometry is homogeneous (mass-energy is evenly distributed) and isotropic (the universe looks basically the same in every direction from every location). While not an unreasonable assumption, adopting this principle means that calculations of global structure that are justified on this basis can be challenged. Even cosmic inflation,<sup>21</sup> invoked to explain the homogeneity and isotropy of the *observable* universe, only succeeds, if correct, in pushing potential inhomogeneities beyond the horizon of what we can see. Arguments for the cosmological principle range from its utility as a simplifying assumption to its being a necessary condition for global theorizing in cosmology,<sup>22</sup> but quite apart from such pragmatic considerations, its status as a *metaphysical* assumption used to extend cosmological research into arenas beyond the observable, however reasonable, should be recognized.

Furthermore, as Guillermo Gonzalez and Jay Richards<sup>23</sup> have noted by way of ideological progression, the relatively innocuous cosmological principle has come to be identified with another more general idea known variously as the *Copernican Principle*, or the *Principle of Mediocrity*, or the *Principle of Indifference*. The principle of mediocrity proclaims that there is nothing exceptional about the time or place of the Earth in the universe, or more pointedly, it proclaims that “the universe is not organized for our benefit and we are not uniquely privileged observers.”<sup>24</sup> In other words, the universe is not designed with us in mind, we are not here for any transcendent purpose, and we are about as metaphysically insignificant as our astronomical location would seem to indicate (which is to say, we matter not one whit). In this latter guise, the principle of mediocrity is an extension of scientific materialism, the view that material reality is all there is, ever was, and ever will be, and we live in a universe that is indifferent to our existence. Against this background, science is frequently praised as our only “candle in the dark,” our only means to truth

20. Christopher Smeenk, “Cosmology,” in *The Routledge Companion to the Philosophy of Science*, 2nd ed., ed. Martin Curd and Stathis Psillos (New York: Routledge, 2014), 609-20.

21. See the discussion below and the account in Alan Guth, *The Inflationary Universe: The Quest for a New Theory of Cosmic Origins* (Reading: Perseus Books, 1997).

22. Claus Beisbart, “Can We Justifiably Assume the Cosmological Principle in Order to Break Underdetermination in Cosmology?” *Journal for General Philosophy of Science* 40 (2009): 175-205.

23. Guillermo Gonzalez and Jay Richards, *The Privileged Planet: How Our Place in the Cosmos is Designed for Discovery* (Washington, D.C.: Regnery, 2004), 247-74.

24. Jim Baggott, *Farewell to Reality: How Modern Physics Has Betrayed the Search for Scientific Truth* (New York: Pegasus Books, 2013), 23.

in an implacable universe, so scientific materialism often has scientism as a close companion.

The principle of mediocrity can be challenged in a variety of ways, not just by considering the singular properties of the Earth and its local environment,<sup>25</sup> but also on the basis of what physics dictates the cosmological conditions must be for the universe to be habitable.<sup>26</sup> One of the key discoveries of contemporary cosmology is that we live in a “Goldilocks universe” that is “just right” in the sense of being fine-tuned for the existence of embodied conscious beings such as ourselves.<sup>27</sup> Most of us intuitively grasp that the precise correlation of the properties necessary for the universe to be habitable with the extraordinarily fine-tuned initial conditions, law—like natural regularities, and values for the constants of nature is an overwhelming coincidence which—when the demonstrable inadequacy of undirected material mechanisms to produce it and the obvious causal sufficiency of intelligent agency to explain it are appreciated—warrants an inference to intelligent design. Nonetheless, there has been a debate among philosophers of science and mathematicians as to how the probability of such fine-tuning can be measured and evaluated in a way that would

25. Guillermo Gonzalez, “Habitable Zones and Fine-Tuning,” in *The Nature of Nature: Examining the Role of Naturalism in Science*, ed. Bruce L. Gordon and William A. Dembski (Wilmington: ISI Books, 2011), 602-38; Gonzalez and Richards, *Privileged Planet*; and Hugh Ross, “Probability for Life on Earth” (2004), accessed June 29, 2017, [www.reasons.org/articles/probability-for-life-on-earth](http://www.reasons.org/articles/probability-for-life-on-earth).

26. Luke Barnes, “The Fine-Tuning of the Universe for Intelligent Life” (2012), accessed June 29, 2017, <https://arxiv.org/pdf/1112.4647.pdf>; John D. Barrow and Frank J. Tipler, *The Anthropic Cosmological Principle* (Oxford: Oxford University Press, 1986); Robin Collins, “A Scientific Argument for the Existence of God: The Fine-Tuning Design Argument,” *Reason for the Hope Within*, ed. Michael J. Murray (Grand Rapids, MI: Eerdmans), 47-75; Robin Collins, “Evidence for Fine-Tuning,” in *God and Design: The Teleological Argument and Modern Science*, ed. Neil A. Monson (New York: Routledge, 2003), 178-99; Robin Collins, “The Teleological Argument: An Exploration of the Fine-Tuning of the Universe,” in *The Blackwell Companion to Natural Theology*, ed. William L. Craig and J. P. Moreland (Oxford: Blackwell, 2009), 202-81; Robin Collins, “The Fine-Tuning Evidence is Convincing,” in *Debating Christian Theism*, ed. J. P. Moreland, Chad Meister, and Khalidoun A. Sweis (New York: Oxford University Press, 2013), 35-46; Paul Copan and William Lane Craig, *Creation out of Nothing: A Biblical, Philosophical, and Scientific Exploration* (Grand Rapids, MI: Baker Academic, 2004); P. C. W. Davies, *The Accidental Universe* (Cambridge: Cambridge University Press, 1982); Bruce L. Gordon, “Inflationary Cosmology and the String Multiverse,” *New Proofs for the Existence of God: Contributions of Contemporary Physics and Philosophy*, ed. Robert J. Spitzer (Grand Rapids, MI: Eerdmans, 2010), 75-103; Gordon, “Balloons on a String,” 558-601; Rodney D. Holder, *God, the Universe, and Everything: Modern Cosmology and the Argument from Design* (Burlington: Ashgate, 2004).

27. Barnes, “Fine-Tuning;” Barrow and Tipler, *Anthropic Cosmological Principle*; Collins, “Scientific Argument;” Collins, “Evidence for Fine-Tuning;” Collins, “Teleological Argument;” Collins, “Fine-Tuning Evidence is Convincing;” Holder, *God, the Multiverse, and Everything*.

warrant such a design inference.<sup>28</sup> A sophisticated and broadly accepted approach has been developed by Robin Collins, but we cannot examine its details here.<sup>29</sup> Instead, we will take a look at how the fine-tuning of our universe manifests itself on three levels—the initial conditions governing the Big Bang, the mathematical form of the laws of nature, and the precise values of many of the constants of nature<sup>30</sup>—and indicate why the undirected mechanisms of a speculative “multiverse cosmology” can never provide a sufficient basis for its explanation.

## **The Fine-Tuning of the Regularities of Nature**

One aspect of cosmological fine-tuning is the mathematical form taken by the regularities of nature. There is an uncountable infinity of possible mathematical forms. How is it that nature exhibits mathematical regularities of a form requisite to a universe that is *habitable*? Many of the law-like regularities of nature have a general form necessary to the existence of embodied conscious agents like ourselves since, if such laws were not operative, it would be impossible for an environment to exist that could sustain such life:

### **1. Gravity**

What would happen if there were no long-range attractive force between material objects while all the other forces of nature, as far as possible, remained the same? In such case, there would be no stars and hence no long-term energy sources to sustain life. Planets, if there were such, would exist merely by cohesion, would almost certainly lack any atmosphere, and would not provide a stable platform for the development or persistence of life, which even if it did exist, could easily float off into space with no means of return.

### **2. The Strong Force**

The strong force binds the nucleons together in the nucleus of the atom. If there were no such force, the nucleons would not cohere and both electromagnetic repulsion among protons and quantum energy fluctuations in the nucleon fields would drive the constituents of the nucleus apart. Furthermore, because of electromagnetic repulsion, the strong force must be considerably stronger than the electromagnetic force, but to keep atoms of limited size, it must also only operate over a very short

28. See Robin Collins, “Fine-Tuning Arguments and the Problem of the Comparison Range,” *Philosophia Christi* 7, no.2 (2005): 385-404; Timothy McGrew, Lydia McGrew, and Eric Vestrup, “Probabilities and the Fine-Tuning Argument: A Skeptical View,” in *God and Design: The Teleological Argument and Modern Science* (New York: Routledge, 2003), 200-8; Timothy McGrew and Lydia McGrew, “On the Rational Reconstruction of the Fine-Tuning Argument,” *Philosophia Christi* 7, no.2 (2005): 425-443; Alexander Pruss, “Fine- and Coarse-Tuning, Normalizability, and Probabilistic Reasoning,” *Philosophia Christi* 7, no.2 (2005): 405-23; and Jay Richards, “Some Preliminary Questions to Any Future Fine-Tuning Argument,” *Philosophia Christi* 7, no.2 (2005): 369-81.

29. See Collins, “Fine-Tuning Arguments and the Problem of the Comparison Range” and “Teleological Argument.”

30. See Collins, “Fine-Tuning Arguments and the Problem of the Comparison Range,” “Teleological Argument,” and “Fine-Tuning Evidence is Convincing.”

range. If it operated at an unlimited range like gravity, then given its current strength of about forty orders of magnitude *greater* than gravity, it would turn the universe into a giant black hole.

3. The Electromagnetic Force

Without electromagnetism there would be nothing to hold electrons in orbit around the nucleus of an atom and no chemistry to speak of, including, of course, the chemistry that forms the basis of life. Furthermore, there would be no means of energy transmission for nuclear processes in stars to support the existence of life on planets.

4. Quantization of Energy

If we view the atom from the classical Newtonian perspective, an electron should be able to orbit at any distance from the nucleus of an atom just as a planet can orbit at any distance from the sun. However, Maxwell's laws of electromagnetism dictate that any accelerating charged particle will emit radiation, and, as Newton's laws imply, electrons orbiting the nucleus of an atom are accelerating because their direction of motion is constantly changing. By emitting radiation, however, the electrons are losing energy, and this loss of energy would cause the electron's orbit to decay so quickly that an atom could not exist for more than a minute or so. This was the problem faced by Rutherford's model of the atom, which was resolved in 1913 by Bohr's (at the time) *ad hoc* proposal of a quantization rule that required electronic orbital shells of fixed energies. Without such a quantization rule, however, atoms could not exist and neither could life.

5. The Exclusion Principle

Finally, consider Pauli's Exclusion Principle, which dictates that no two fermions (particles with half-integral spin) can occupy the same quantum state. The exclusion principle limits the number of electrons in each quantized orbital shell, thereby allowing the complex chemistry necessary for life, for otherwise all electrons would end up in the lowest orbital. Furthermore, Pauli's principle also applies to the nucleus of the atom, thus preventing an indefinite number of neutrons from falling into the lowest nuclear shell, and thereby putting a limit on atomic weight, another condition that seems necessary for life.

## **The Fine-Tuning of the Initial Conditions of the Universe**

Other aspects of fine-tuning relate to the initial conditions of the universe. An *initial condition* specifies the state of a physical system at a particular time such that, for all subsequent times, the equations of motion and their associated constraints will describe all future states. In speaking of the initial conditions of the universe, one can focus on a variety of cosmic parameters—the mass-density of the early universe, the strength of the big bang explosion, the strength of the density perturbations leading to star formation, the ratio of radiation density to the density of normal matter—and

so on. Various arguments for the fine-tuning of these parameters have been made. I want to focus on a related condition, the initial entropy of the universe, which on analysis has to be *exceedingly low* and thus *incredibly fine-tuned* to produce a universe resembling the one in which we live.

To get at this number, we need the concept of statistical entropy developed by the nineteenth-century physicist, Ludwig Boltzmann. In statistical mechanics, entropy is essentially a measure of the number of ways in which a system may be arranged and is often taken as a measure of “disorder” (the higher the entropy, the higher the disorder, with maximum entropy being present in the equilibrium state). To be specific, the statistical entropy, denoted by  $S$ , is proportional to the natural logarithm of the number of possible microscopic configurations of the individual atoms and molecules of the physical system (this number of microstates being denoted by  $W$ ) which could give rise to the observed macroscopic state (macrostate) of the system as a whole. The constant of proportionality is known the Boltzmann constant,  $k_B$ , yielding Boltzmann’s well-known formula for statistical entropy:  $S = k_B \ln(W)$ .

Roger Penrose (1931- ) calculated how fine-tuned the initial entropy of our universe had to be by comparing the statistical entropy of the observable universe with the entropy it could have had emerging from the Big Bang singularity.<sup>31</sup> The statistical entropy *per* baryon (protons and neutrons, for all practical purposes) for the observable universe can be estimated by supposing that it consists of galaxies mostly populated by ordinary stars, where each galaxy has a million-solar-mass black hole at its center. Under such conditions, the statistical entropy *per* baryon (a dimensionless number) is calculated to be  $10^{21}$ , which, given the fact that there are about  $10^{80}$  baryons in the observable universe, yields an *observed statistical entropy for our Universe* as a whole *on the order of*  $10^{80} \times 10^{21} = 10^{101}$ . The fine-tuning of universal entropy is essentially the ratio of the volume of the phase-space (that is, the position-momentum space) of the observed statistical entropy in the universe to the volume of the phase-space for the statistical entropy it *could have had* emerging from a singularity whose entropy is calculated using the Bekenstein-Hawking formula for black-hole entropy (think of time-reversed movie that runs the Universe backward until it collapses into the singularity from which it emerged). Since  $10^{123}$  is the natural logarithm of the volume of the position-momentum (phase) space associated with initial universal entropy when calculated using the Bekenstein-Hawking formula, the phase-volume itself is given by the exponential:  $V = e^{10 \exp(123)}$ ; similarly, the *observed* total entropy is  $W = e^{10 \exp(101)}$ . For numbers this size, it makes really no difference to the order of magnitude of our answer if we substitute base 10 for the base of the natural logarithm, which Penrose does. Taking the ratio, the required precision in the

31. Roger Penrose, “Time-asymmetry and quantum gravity,” in *Quantum Gravity 2*, ed. C. Isham, R. Penrose, and D. Sciama (Oxford: Clarendon, 1981), 245-72; see also Roger Penrose, *The Road to Reality: A Complete Guide to the Laws of the Universe* (New York: Alfred A. Knopf, 2005), 757-65.



Big Bang to produce a habitable universe with the statistical entropy ours is observed to have is therefore (observed entropy W / possible entropy V):

$$W/V \approx 10^{10\exp(101)}/10^{10\exp(123)} = 10^{\exp(10^{101} - 10^{123})} \approx 10^{-10\exp(123)}.$$

In other words, to satisfy the observed entropy of *our* universe, the Big Bang singularity had to be fine-tuned to one part in  $10^{10\exp(123)}$ , that is,  $1 / 10^{10\exp(123)}$ . If it were written out, there are ten million trillion-trillion-trillion more zeros in the denominator of this number than there are particles in the observable universe! This level of fine-tuning is staggering and not reasonably attributed to chance.<sup>32</sup>

### The Fine-Tuning of the Constants of Nature

But the fine-tuning of the universe does not stop with its law-structure and its initial conditions; it also includes many of the fundamental constants of nature and their relationships to each other.<sup>33</sup> Space prohibits canvassing the full extent of the fine-tuning of natural constants, so we will focus on just a few.<sup>34</sup>

#### 1. Newton's Gravitational Constant Relative to the Other Fundamental Forces

The strength of the force of gravity, represented by Newton's constant, is forty orders of magnitude weaker than that of the strong force holding the nucleus of the atom together, the latter representing the strongest of the four fundamental forces. Given that the strengths of the forces of nature are *measured* quantities that are not derived from the theories that represent them, they could presumably have been different from what they are, and the observed range of strengths helps us to set a scale on which they might have varied. Currently gravity is one ten thousand

32. Two proposals have been suggested by way of trying to mitigate this entropic fine-tuning: (1) the inflationary multiverse overcomes the probabilistic obstacles; and (2) there is some special law that requires a perfectly uniform gravitational field at the beginning of time, thus giving rise to maximally low entropy. As we shall see presently, the inflationary multiverse proposal has massive fine-tuning problems of its own, as well as creating conditions that undermine the very possibility of scientific rationality. The second proposal, that there is a special law requiring a perfectly uniform gravitational field (in technical language, a gravitational field with zero Weyl curvature), merely shifts the locus of fine-tuning from the Big Bang itself to the gravitational field associated with it. In other words, it merely displaces the fine-tuning problem to another area without resolving it. The Weyl Curvature Hypothesis also has been unpopular among naturalistically-minded physicists for a different reason: it requires a genuine singularity at the beginning of time at which all the laws of physics break down.

33. See Barnes, "Fine-Tuning;" Barrow and Tipler, *Anthropic Cosmological Principle*; Collins, "Scientific Argument;" Collins, "Evidence for Fine-Tuning;" Collins, "Teleological Argument;" Collins, "Fine-Tuning Evidence is Convincing;" Davies, *Accidental Universe*; G. F. R. Ellis, "Issues in the Philosophy of Cosmology," in *Handbook of the Philosophy of Physics, Part B*, ed. John Earman and Jeremy Butterfield (Amsterdam: Elsevier, 2007), 1183-1286; Gordon, "Inflationary Cosmology and the String Multiverse," 75-103; Gordon, "Balloons on a String," 558-601; and Holder, *God, the Multiverse, and Everything*.

34. See Collins, "Evidence for Fine-Tuning" for more details.

trillion-trillion-trillionth the strength of the strong force. Suppose we changed it so that it was still very small in comparison, say ten thousand trillion trillionths the strength of the strong force. Small though this fraction is, it still represents a trillion-fold increase in the strength of the gravitational force, which would have the effect of crushing virtually all life out of existence—or more accurately, preventing it from existing in the first place. This sensitivity is exacerbated by the consequences of tweaking the strength of the gravitational force while maintaining the same mass density, radiation to matter ratio, and cosmological constant in the very early universe. As Paul Davies calculates,<sup>35</sup> if the strength of gravity were larger or smaller by one part in  $10^{60}$  of its current value, the universe would either have exploded too quickly for stars and galaxies to form, or collapsed back on itself too quickly for life to have developed. As is clear from this example, the fine-tunings in nature often involve the relative values of more than one quantity instead of the stand-alone fine-tuning of a single quantity.

## 2. The Cosmological Constant

The cosmological constant,  $\Lambda$ , is a term in Einstein's field equations for general relativity that, when positive, acts as a repulsive force driving the expansion of space and, when negative, acts as an attractive force causing space to contract. Einstein's equations imply that if the vacuum—spacetime devoid of normal matter—has an energy density, then that energy will play the mathematical and hence physical role of a cosmological constant. The need for the fine-tuning of this cosmological constant, understood as the vacuum energy, arises from the fact that almost all real or hypothesized fields in contemporary physics—the electromagnetic field, the fields associated with various elementary particles, the Higgs field, the inflaton field in inflationary cosmology, the dilaton field in superstring theory, and so on—contribute to the vacuum energy so as to drive it far, far beyond the maximum life-permitting limit. If this cosmological constant were larger than some positive value or smaller than some negative value, then again, the universe would have expanded too quickly (if positive) or collapsed too quickly (if negative) for stars and galaxies to have formed, thus also prohibiting the existence of living organisms.

Let us define the *effective cosmological constant* as the sum of all of the contributions of factors that function in the same way as Einstein's cosmological constant in respect of causing space to expand or contract. The fine-tuning of the effective cosmological constant can now be stated this way: unless some new principle of physics is discovered, without being fine-tuned, the effective cosmological constant is expected from calculations in quantum field theory to be about  $10^{120}$  larger than the maximum life-permitting value, meaning that its actual value is fine-tuned to one part in  $10^{120}$ , that is, fine-tuned to 120 decimal places.

35. Davies, *Accidental Universe*, 89.

3. Supersymmetry and the Mass of the Higgs Boson

Some physicists have suggested that supersymmetry, if correct, would obviate the fine-tuning of the cosmological constant. Supersymmetry postulates a symmetry between fermions (half-integer-spin matter particles) and bosons (integer-spin force/radiation or “messenger” particles) in which all the known particles of the Standard Model have “superpartners” of the opposing type. It further requires that the positive vacuum energy associated with each bosonic field is exactly cancelled by the negative vacuum energy of the corresponding fermionic field, yielding a net contribution of zero to the cosmological constant. Nonetheless, this solution faces a major difficulty in that, even if supersymmetry were correct, it is a broken symmetry at present-day energies, and there is no natural way of implementing symmetry breaking while retaining this cancellation of contributions to the cosmological constant. Beyond this, with the failure to observe supersymmetric particles at the new energies achieved by the Large Hadron Collider (LHC) in Geneva, Switzerland, many theoretical physicists are concluding that supersymmetry is *false* and new approaches need to be tried, in which case no obviation of the fine-tuning of the cosmological constant is achieved.

More specifically, in respect of the contributions of the Higgs field to this fine-tuning, with the recent discovery of the Higgs boson within its predicted range, we note that it has been shown that if the Higgs boson were even 5 times more massive than its measured value, it would suppress the formation of all atoms other than hydrogen, effectively rendering the universe lifeless.<sup>36</sup> In the absence of supersymmetric cancellations between fermions and bosons, then, the Higgs field *alone* has to be fine-tuned to about one part in  $10^{18}$  for the Higgs boson to have its observed mass.<sup>37</sup>

4. Neutron Mass

The neutron is marginally heavier than the proton by a factor of around 1.293 MeV. We won’t go into the details, but if the neutron’s mass were increased by another 1.4 MeV, i.e., by one part in 700 of its actual mass of 938 MeV, then one of the key steps in the fusion process by which stars burn their hydrogen into helium could not occur.<sup>38</sup> This one-sided fine-tuning of the neutron mass can be translated into a two-sided fine-tuning parameter for the down-quark mass of about one part in 18,000 of the range of quark masses.

5. The Weak Force Coupling Constant

Because of the high temperature and mass-energy density in the first few seconds after the Big Bang, neutrons and protons readily interconverted via the weak

36. V. Agrawal, Stephen M. Barr, John F. Donoghue, and D. Seckel, “The anthropic principle and the mass scale of the Standard Model,” *Physical Review D* 57 (1998): 5480-5492, accessed June 29, 2017, <https://arxiv.org/pdf/hep-ph/9707380.pdf>.

37. See the helpful discussion of this instance of fine-tuning in Geraint Lewis and Luke Barnes, *A Fortunate Universe: Life in a Finely Tuned Cosmos* (Cambridge: Cambridge University Press, 2016), 58-63.

38. See Collins, “Evidence for Fine-Tuning,” 186ff.

force through interactions also involving electrons, positrons, neutrinos and anti-neutrinos. The rate of this interconversion was dependent upon the temperature, the mass-energy density, the mass difference between the proton and the neutron, and the strength of the weak force. Because the neutron is more massive than the proton, at thermal equilibrium, the ratio of neutrons to protons will always be less than one, but the higher the temperature is, the closer the ratio will be to one. As the universe expands, however, the density of the particles relevant to interconversion rapidly decreases, and at some point the interconversion effectively stops. This “freeze-out” temperature ultimately determines the ratio of neutrons to protons, and the higher it is, the closer the ratio will be to one. Furthermore, since the interconversion proceeds via the weak force, it is highly dependent on the strength of this force. The stronger the weak force, the greater the rate of interconversion at any temperature and density, lowering the freeze-out temperature, but if the weak force were decreased, the opposite would happen, raising the freeze-out temperature. Since the freeze-out temperature is proportional to the weak-force coupling constant in this way, one can calculate that decreasing the weak force relative to the range of strengths of the physical forces by one part in a billion would have the effect of raising the freeze-out temperature to a point where most of the protons would combine with neutrons to produce deuterium and tritium, which would fuse to form  $^4\text{He}$  during the early stages of the Big Bang. As a consequence, stars would burn helium rather than hydrogen and have life spans of only 300 million years rather than several billion years, severely limiting the prospects for the appearance of life. So the one-sided fine-tuning of the weak force relative to the range of strengths of the fundamental forces is about one part in a billion.

### **An Excursus on “Naturalness” and Mediocrity as a Prelude to the Multiverse**

As the false narrative of the history of science goes, ever since Copernicus displaced the Earth from the center of the cosmos, humanity and its physical surroundings have been on a downward path to utter mediocrity.<sup>39</sup> As succinctly and colorfully stated by Douglas Adams in *The Hitchhiker’s Guide to the Galaxy*:

Far out in the uncharted backwaters of the unfashionable end of the western spiral arm of the galaxy lies a small unregarded yellow sun. Orbiting it at a distance of roughly 93 million miles is an utterly insignificant little blue-green planet whose ape-descended life forms are so amazingly primitive that they still think digital watches are a pretty neat idea.<sup>40</sup>

39. Never mind that displacing Earth from the center in medieval cosmology would be doing humanity a favor: hell was at the very center of the center of the cosmos, and heaven, the most exceptional realm, was as far away from the center as you could get. Any move away from the center was a promotion.

40. Douglas Adams, *The Hitchhiker’s Guide to the Galaxy* (New York: Del Rey 1995 [1979]), 1.

This rush to mediocrity gives us *one* sense of what scientists often mean by “naturalness”: something is *natural* because it’s *unexceptional*. The discovery of cosmological fine-tuning represents a trend in the opposite direction, however, since, with mediocrity as the gold standard, it’s highly *unnatural*. Scientists who want the issue of fine-tuning to go away are concerned that the startling exceptionality indicated by cosmological fine-tuning might, God forbid, even provide evidence for *intelligent design*. Stanford theoretical physicist Leonard Susskind, staunch advocate of the inflationary string landscape hypothesis as a multiverse remedy for fine-tuning, expressed the worry this way:

If, for some unforeseen reason, the landscape turns out to be inconsistent—maybe for mathematical reasons, or because it disagrees with observation ... [then] as things stand now we will be in a very awkward position. Without any explanation of nature’s fine-tunings we will be hard pressed to answer the ID critics.<sup>41</sup>

Appeal to a multiverse is currently the preferred strategy for restoring an appropriate sense of mediocrity. If our universe can somehow be seen as a very typical example of the sort of universes one finds in a multiverse, we can still revel in the naturalness of being ever-so-average and not be troubled by exceptionality. But even if multiverse theories should fail to confirm our mediocrity, we might at least find a material explanation of our exceptionality through appeal to observer-selection effects: we have to live in a corner of the multiverse that is compatible with our existence as observers, so even if observer-supporting patches of the multiverse are exceptional, our presence in one of them is not, because we could not exist anywhere else. By means of such anthropic selection, then, we can at least appreciate that it would be unseemly to take pride in our exceptionality because we weren’t intended to exist; we were merely the lucky byproduct of a random process. In this respect, multiverse explanations have a lot in common with neo-Darwinian explanations.

The second strategy for preserving a sense of “naturalness” actually came first historically among physicists, but it has fallen on hard times as of late. Naturalistically minded physicists who nonetheless despise speculative multiverse explanations of fine-tuning have hope that this strategy might even yet be restored. The sense of “naturalness” it embodies is best described as one of *inevitability*. This viewpoint was very clearly articulated by Einstein and is represented by his remark that what really interested him was whether God had a choice in creating the world. In his autobiographical notes in the Schilpp collection, Einstein put the thought this way:

I would like to state a theorem which at present cannot be based upon anything more than a faith in the simplicity, i.e., intelligibility, of nature . . . nature is so

41. This quote comes from an interview with Leonard Susskind conducted by Amanda Gefter, “Is String Theory in Trouble?” *New Scientist Magazine*, December 14, 2005, accessed June 29, 2017, <https://www.newscientist.com/article/mg18825305-800-is-string-theory-in-trouble/>

constituted that it is possible logically to lay down such strongly determined laws that within these laws only rationally completely determined constants occur (not constants, therefore, whose numerical value could be changed without destroying the theory).<sup>42</sup>

The naturalness of inevitability in this sense can be related to the naturalness of unexceptionality in this way: what is inevitable is not special because it *could not be otherwise*. If it is going to be, it has to be *this* way. Of course, it might still be special if it did not have to exist at all, yet, nonetheless, there it is, and since its laws, say, have the *only* form they could have and they completely *determine* their associated constants, we marvel at the fact that the only thing that *could* exist, does in fact exist—for its *actual* existence, logically and metaphysically speaking, seems a very contingent affair. The radical contingency of there being a universe at all brings us to the doorstep of the theistic point of view. So it is not hard to see that, from the perspective of classical monotheism, the universe can be expected to have *both normal and exceptional aspects*.

Given that the universe is understood to be the *free* creation of a rational God, it is natural to suppose that one should have to *look* at the creation to see what God in fact has done, for in his freedom, he might have done many things and it is quite proper that some of them should follow by necessity (inevitability) from certain of his choices and others be startlingly exceptional. The theist thus expects *law-like regularity in nature* and for this reason is unsurprised, to paraphrase Galileo (1564-1642), that the book of nature is written by God in the language of mathematics. The universe is subject to selective regular mathematical description because such order is (a) necessary to the very existence of embodied beings; and (b) indispensable to reliable belief formation among such beings. But, from a theistic perspective, *exceptionalities in nature* are also be expected because, as a divine creation, *nature is not self-sufficient* in either its *origin* or its *operational parameters*. Its *ontological non-self-sufficiency* is evident in its *contingent character* (it did not have to exist, it has not always existed, and certain of its properties might have been other than those it actually has). Furthermore, it can be argued that its *operational non-self-sufficiency* is manifested in the fine-tuning of multiple parameters for the existence of life and, arguably, in the fact that a principle of sufficient *physical* causality fails in the quantum realm (see the discussion in §3). From a theistic perspective, this operational *non-self-sufficiency* is another expression of the *freedom* of divine creativity, and it speaks of ongoing divine intimacy and involvement with created reality—we are, after all, talking about *theism*, not *deism*. In short, the theist is troubled neither by what appears normal nor by what appears exceptional, and is content to follow the evidence wherever it may lead.

42. Albert Einstein, “Autobiographical Notes,” in *Albert Einstein: Philosopher-Scientist*, ed. Philip Schilpp (LaSalle: Open Court, 1949), 63.



With these things in mind, let's take a look at the idea that a multiverse could explain away the fine-tuning of our universe as an observer selection effect. We begin by considering the hypothesis of cosmic inflation.

## **Inflationary Cosmology**

The idea of cosmic inflation is that, a split-second after the Big Bang, the universe underwent a short period of hyper-accelerated expansion that “smoothed out” our local cosmic environment by pushing any inhomogeneities beyond the boundary of what can be seen. Specifically, Alan Guth invented cosmic inflation in 1980 to explain why the temperature of the cosmic background radiation was the same throughout the observable universe to one part in a hundred thousand, and why the density of mass-energy resulting from the Big Bang yielded a universe that was flat to at least one part in a quadrillion (explanatory demands known respectively as the “horizon” and “flatness” problems). As it turned out, the most viable theoretical model of the inflationary process, chaotic eternal inflation, requires that once inflation starts it never ceases. Inflation thus produces a potentially infinite number of “bubble universes,” each with *different* initial conditions, which suggests that a bubble universe with initial conditions as fine-tuned as our own is bound to occur sooner or later.

The irony of this proposal, at least in regard to the principle of mediocrity as an expression of scientific materialist philosophy, is that inflationary processes actually *increase* rather than decrease the fine-tuning of its initial conditions. For instance, the energy of the inflationary field has to be shut off with tremendous precision in order for a universe like ours to exist, with inflationary models requiring shut-off accuracies ranging from one part in  $10^{53}$  to as much as one part in  $10^{123}$ , depending on the particular inflationary model in view. Furthermore, achieving thermodynamic equilibrium in the cosmic microwave background radiation through inflation is an *entropy-increasing process* (it increases the thermodynamic disorder of the cosmos), yet even without it, as we have seen, our universe's initial entropy was fine-tuned to one part in 10 to the 10 to the 123<sup>rd</sup> power. In other words, adding exponential inflationary growth to the *already* hyper-exponentially fine-tuned entropy required by the Big Bang has the effect of *exponentially increasing* its already hyper-exponential fine-tuning! But there is more. Theoretical cosmologists Sean Carroll and Heywood Tam have shown that the chance of inflation actually occurring as part of any *realistic* cosmological history is only one in 10 to the 66,000,000<sup>th</sup> power.<sup>43</sup> Of course, the fact that chaotic eternal inflation—if it ever happens—generates an unending and rapid succession of bubble universes with different initial conditions (a “multiverse”), gives scientific materialists what they say they want: a scenario in which the staggering improbabilities just mentioned do not matter because *every* initial condition is

43. Sean Carroll and Heywood Tam, “Unitary Evolution and Cosmological Fine-Tuning” (2010), accessed June 29, 2017, <https://arxiv.org/pdf/1007.1417v1.pdf>

realized sooner or later (in fact, it is realized infinitely many times)! As we shall soon see, however, this ontological profligacy comes at a price.

## **The Anthropic String Landscape**

Before we offer further critique of multiverse cosmology, we need to consider two more aspects of fine-tuning that cosmic inflation—which focuses solely on initial conditions—does not address: the form of the *laws of nature* and the values of the *constants of nature*. There is only one cosmological theory—the anthropic string landscape—that offers mechanisms aimed at explaining away the fine-tuning evident in the mathematical form of natural laws and the values of natural constants.

The only way for a scientific materialist to avoid the conclusion that our universe exemplifies transcendent intelligent design is to propose there is a blind universe-creating mechanism that produces universes with an endless variety of different properties (laws, constants, and initial conditions) and that our universe is the chance outcome of such a mechanism. The reason *we* observe our universe to have the life-permitting properties it does is the result of an “observer selection effect”: given that we exist, it must be in a region of the multiverse that has conditions compatible with our existence. This is the essence of the “anthropic string landscape”<sup>44</sup> proposal as a “solution” to the scientific materialist’s fine-tuning problem.

To see how this blind universe-creating mechanism is supposed to work, we need a conceptual grasp of certain details about string theory. String theory is a branch of theoretical physics that has received a lot of attention in the last forty years as a potential “theory of everything” that could unite the four fundamental forces of nature (gravity, electromagnetism, the weak force, and the strong force) under one mathematical umbrella as the manifestation of a single fundamental force: *gravity*. It postulates that the fundamental constituents of nature are one-dimensional filaments instead of particles. These filaments are either open-ended or closed into loops and they vibrate in different ways to produce all the different kinds of “particles” we observe. For string theory to allow for the existence of both radiation and matter while satisfying the rules of quantum mechanics, two things have to be the case: a theoretical constraint called “supersymmetry” must be satisfied and the strings must

44. Leonard Susskind, “The Anthropic Landscape of String Theory,” accessed June 29, 2017, <https://arxiv.org/pdf/hep-th/0302219.pdf>; Leonard Susskind, *The Cosmic Landscape: String Theory and the Illusion of Intelligent Design* (New York: Little, Brown, and Company, 2006); Steven Weinberg, “Living in the Multiverse,” in *The Nature of Nature: Examining the Role of Naturalism in Science*, ed. Bruce L. Gordon and William A. Dembski (Wilmington: ISI Books, 2011), 547–57. See also the interesting discussion of the historical background to all of these developments in Helge Kragh, *Higher Speculations: Grand Theories and Failed Revolutions in Physics and Cosmology* (Oxford: Oxford University Press, 2011).

move in a spacetime having ten dimensions.<sup>45</sup> The extra six spatial dimensions in string theory must be curled up or “compactified” at each point of spacetime into a structure so small it cannot be observed since, quite obviously, the universe we inhabit only has three large spatial dimensions. The problem is that there are *infinitely many ways* of folding these extra spatial dimensions into unobservable structures. Nonetheless, the *shape* of each such compact structure dictates the *form* of the laws of nature in the three dimensions we can see, and the relative *sizes* of the curled dimensions in these structures dictates the *strength* of the natural constants. Consequently, each of the infinitely many compactifications represents a universe with different natural laws and constants that, taken collectively, form an infinite *landscape* of universes having different properties: every one of the infinitely many solutions of string theory thus represents a different physics.

The trick for anthropic string landscape theorists is turning the *vice* of a theory with infinitely many solutions capable of describing almost any reality you please into a *virtue* that explains away the fine-tunings of our universe. In the early 2000s it was discovered that there are somewhere between  $10^{500}$  and  $10^{1000}$  compactifications that have a positive cosmological constant and might therefore be able to describe our universe. In light of this discovery, the just-so story detailing how the universe got its spots<sup>46</sup> runs like this: The branch of the multiverse that contains our universe started in the highest possible energy state for the effective cosmological constant (because it must for the model to work) and, through the random quantum decay of various features of the initial compactification, cascaded in different directions down the energy scale of the landscape, each sequential decay launching an eternally inflating bubble representative of a particular combination of laws and constants, then chaotically decaying itself into smaller bubble universes with yet different combinations of laws and constants. By such means, it is postulated (without any justification save that it is needed if the model is to serve its explanatory purpose) that the *whole* landscape of compactifications representing different laws and constants will be explored. The fact that our universe, which must inevitably arise in the course of a random exploration stipulated to be exhaustive, has properties fine-tuned for the existence of life, can then be explained as an observer selection effect: while there are infinitely many universes in the landscape that have different properties, most of which are incompatible with the existence of life, we must exist in a region of the multiverse that is compatible with our existence. The fact that we live in a universe with the finely-tuned conditions necessary to our existence is therefore not a cause for surprise.

45. In 1994, ongoing research into the mathematical relationship among the five anomaly-free classes of string theories led to discovery of an eleventh unifying dimension, resulting in a new theoretical construct that physicists call “M-theory” (“M” for “membrane”, or “mystery”, or even “mother-of-all-theories”).

46. See Casey Luskin, “Just-So Stories,” in *Dictionary of Christianity and Science*, ed. Paul Copan *et al.* (Grand Rapids, MI: Zondervan, 2017), 396.

We may legitimately ask whether Susskind and other landscape theorists are justified in pinning their hopes on such theories. Addressing the full range of fine-tuning (initial conditions, laws, and constants) requires *fusing* inflationary cosmology with string theory, compounding the difficulties and improbabilities associated with each. Close examination not only reveals the deep implausibility and deleterious consequences of such “explanations” of fine-tuning, it also demonstrates, on pain of infinite regress, the impossibility of resolving fine-tuning issues with the explanatory resources available to scientific materialism. We have seen that inflationary cosmology requires fine-tuning that goes far beyond the fine-tuning it was invoked to explain (though, as mentioned, advocates regard all possible initial conditions, no matter how finely-tuned, as inevitably exemplified countless times because of the infinite variation generated by inflation). We now highlight further difficulties with cosmic inflationary explanations before detailing the implausibilities of string theory and showing the in-principle impossibility of multiverse cosmology ever resolving the fine-tuning “problems” generated by materialist constraints on scientific explanation:

(1) Arvind Borde, Alan Guth, and Alexander Vilenkin have shown that any inflationary multiverse has a beginning in the finite past.<sup>47</sup> In other words, while inflationary models can be eternal into the future, it is mathematically impossible for them to be eternal into the past. This means that inflation entails creation *ex nihilo* in much the same way as standard Big Bang cosmology. The inflationary string landscape, by way of the inflationary mechanism, also satisfies this constraint. But if everything that begins to exist has a cause and the multiverse began to exist, then the multiverse has cause which, as logically prior to everything physical, cannot itself be physical (but see point 5, below).

(2) One of the touted strengths of generic inflationary models is their prediction that the CMB will display a normal distribution of energy density fluctuations having the same spectrum at all scales, a prediction largely confirmed by observation. From the standpoint of confirming the theory, however, the difficulty is that this prediction *is not unique to inflation*. The existence of a normal distribution also follows as a straightforward consequence of the Central Limit Theorem in statistics, which states that the mean of a sufficiently large iteration of random variables with well-defined means and variances will have a near-normal distribution.<sup>48</sup> Furthermore, a scale-invariant spectrum of energy fluctuations was also proposed for independent reasons by Harrison<sup>49</sup> and Zel’dovich,<sup>50</sup> *prior* to the advent of inflationary cosmology.

47. Arvind Borde, Alan Guth, and Alexander Vilenkin, “Inflationary spacetimes are not past-complete,” in *Physical Review Letters* 90 (2003), accessed June 29, 2017, <https://arxiv.org/pdf/gr-qc/0110012.pdf>.

48. J. A. Peacock, *Cosmological Physics* (Cambridge: Cambridge University Press, 1999).

49. E. R. Harrison, “Fluctuations at the Threshold of Classical Cosmology,” *Physical Review D* 1, no.10 (1970): 2726-2730.

50. Y. B. Zel’dovich, “A hypothesis, unifying the structure and the entropy of the Universe,” in *Monthly Notices of the Royal Astronomical Society* 160 (1972), 7-8.

(3) Swamping the fine-tuned improbabilities intrinsic to inflation by multiplying the number of universes generated so as to render all possible combinations inevitable has consequences that undermine scientific rationality. In a materialist multiverse resting on the hypothesis of an undirected and irreducibly probabilistic quantum inflationary mechanism lacking any principle of sufficient causality, *anything* quantum-mechanically possible can happen for *no* reason at all (see point 5 below). What is more, anything that *can* happen, no matter how improbable, *does* happen with unlimited frequency, generating something that physicists call the “measure problem.” In such an environment we can have no confidence that the future will resemble the past in a way that legitimates the very inductive inferences that make science possible. In short, taken seriously, the inflationary multiverse proposal *undermines* the very possibility of scientific rationality. MIT theoretical physicist Max Tegmark expresses the problem this way:

[B]y predicting that space isn’t just big but truly infinite, inflation has also brought about the so-called measure problem, which I view as the greatest crisis facing modern physics. Physics is all about predicting the future from the past, but inflation seems to sabotage this. When we try to predict the probability that something particular will happen, inflation always gives the same useless answer: infinity divided by infinity. The problem is that whatever experiment you make, inflation predicts there will be infinitely many copies of you, far away in our infinite space, obtaining each physically possible outcome; and despite years of teeth-grinding in the cosmology community, no consensus has emerged on how to extract sensible answers from these infinities. So, strictly speaking, we physicists can no longer predict anything at all! This means that today’s best theories need a major shakeup by retiring an incorrect assumption. Which one? Here’s my prime suspect:  $\infty$ .<sup>51</sup>

(4) Viewed from another angle, two paradoxes resulting from the inflationary multiverse suggest that our place in such a reality must be very special: the “Boltzmann Brain Paradox”<sup>52</sup> and the “Youngness Paradox.”<sup>53</sup> In brief, if the inflationary mechanism operates in an undirected and self-sufficient way that generates an infinite multiverse, then with probability indistinguishable from one (i.e., virtual necessity) the typical observer in such a multiverse will be a spontaneous

51. Max Tegmark “Infinity is a Beautiful Concept,” 48-51.

52. L. Dyson, M. Kleban, and L. Susskind, “Disturbing Implications of a Cosmological Constant,” *Journal of High Energy Physics* 0210 (2002): 011, accessed June 30, 2017, <https://arxiv.org/pdf/hep-th/0208013v3.pdf>; R. Bousso and B. Freivogel, “A Paradox in the Global Description of the Multiverse,” *Journal of High-Energy Physics* 0706 (2007), 018, accessed June 30, 2017, <https://arxiv.org/pdf/hep-th/0610132.pdf>; Andrei Linde, “Sinks in the Landscape, Boltzmann Brains, and the Cosmological Constant Problem,” *Journal of Cosmology and Astroparticle Physics* 0701 (2007): 022, accessed June 30, 2017, <https://arxiv.org/pdf/hep-th/0611043.pdf>.

53. Alan Guth, “Eternal Inflation and Its Implications,” in *The Nature of Nature: Examining the Role of Naturalism in Science*, ed. Bruce L. Gordon and William A. Dembski (Wilmington: ISI Books, 2011), 487-505.

thermal fluctuation with memories of a past that never existed (a Boltzmann brain) rather than an observer of the sort we take ourselves to be. Alternatively, by a second measure, post-inflationary universes overwhelmingly will have *just* been formed, which means that our existence in a universe as old as our own has a probability that is effectively zero. So either way, if our universe existed as part of an inflationary multiverse, it would not be at all typical, but rather infinitely improbable with respect to its age and compatibility with stable life-forms. Needless to say, the fact that we are not Boltzmann brains and we live in a stable universe that is 13.7 billion years old does not comport well with the principle of mediocrity that motivates inflationary cosmology.

(5) Must every contingent event have a cause? Some have argued that quantum mechanics provides a counter-example to this claim because it describes physical events that, on pain of experimental contradiction, have no *physical* cause. So maybe the multiverse could exist for no reason at all (see point 1 above) and anything that has a non-zero quantum probability, no matter how small, could happen countless times (see point 3 above). Two considerations render this viewpoint inadvisable: First of all, maintaining that events which lack a *physical* cause therefore have *no* cause begs the question against transcendent (non-physical) causation. Absence of a physical cause does not entail the absence of causality altogether unless you have a prior commitment to materialism. Secondly, to maintain that there can be physical states of affairs that have no cause (physical or otherwise) and therefore no explanation at all undermines the possibility of explaining *any* physical state of affairs. The reason for this is that the possibility that there is *no explanation* becomes a competing “explanation” for everything that occurs, and there is no objective basis on which its likelihood can be assessed<sup>54</sup> and thus no way of telling whether the best “explanation” for something is that it has no explanation! In short, the integrity of scientific explanations rests on the assumption that every physical state of affairs has a causal explanation of *some* sort, regardless of whether that explanation is itself physical.

(6) Turning to string theory as the second pillar in the inflationary string landscape hypothesis, we observe that while evidence for the truth of inflationary cosmology is contentious at best,<sup>55</sup> evidence for the truth of string theory is

54. See Alexander Pruss, *The Principle of Sufficient Reason: A Reassessment* (Cambridge: Cambridge University Press, 2006); Pruss, “Leibnizian Cosmological Arguments,” 24-100; see also Jonathan Loose, “Sufficient Reason, Principle of,” in *Dictionary of Christianity and Science*, ed. Paul Copan *et al.* (Grand Rapids, MI: Zondervan, 2017), 649-50.

55. For further critique see Gordon, “Inflationary Cosmology and the String Multiverse,” 75-103; Gordon, “Balloons on a String,” 558-601; Roger Penrose, *The Road to Reality: A Complete Guide to the Laws of the Universe* (New York: Alfred A. Knopf, 2005), 746-57; Paul Steinhardt, “The Inflation Debate,” *Scientific American* 34, no. 4 (2011): 36-43.



non-existent.<sup>56</sup> String theory does not make any *unique* predictions testable by any currently conceivable experiments and its mathematical structure is so rich and all-encompassing that, if supersymmetry proves tenable (see point 7 below), there is virtually no experimental result it cannot accommodate. But a theory compatible with everything *explains nothing*.

(7) String theory presupposes supersymmetry, the postulation of a fundamental symmetry between matter particles (fermions) and radiation particles (bosons), such that these two kinds of particles can transform into each other. If supersymmetry turns out to be false, then string theory will also be false and the inflationary string landscape hypothesis will come to nothing. As things now stand, the energy scale at which supersymmetry was expected to be discovered has been revised multiple times and it still has not been observed. Its failure to manifest in experiments at the Large Hadron Collider (LHC) in Geneva, Switzerland, has contributed to the growing consensus that supersymmetry *is* false<sup>57</sup> and that, if further progress is to be made, theoretical physics needs some new ideas.

(8) The string multiverse was invented to explain away the fine-tuning of natural laws by producing regions with every conceivable form of natural law. But string theory incorporates the mathematical structures of quantum theory (in fact, the landscape is explored through spontaneous quantum transitions), thus requiring both the quantization of energy and the exclusion principle, constraints we earlier noted were necessary for life-supporting universes. As should be obvious, the string landscape does *not* explain away those law structures necessary to life that it must presuppose for its own function.

(9) Lastly, any mechanism that generates universes *ad infinitum* must have stable characteristics that constrain its operation if it is to avoid breaking down and sputtering to a halt. This means that any “universe-generator” will have *design parameters* that themselves *require explanation*. So postulating a random universe-generator to explain away the appearance of first-order design in a single universe *does not obviate the inference to design*, it merely bumps it up to the next level. Avoiding an infinite regress of explanatory demands requires a termination point in *actual* design by an Intelligence that transcends spacetime, matter and energy, and which, existing *timelessly* and logically prior to any universe or multiverse, also *exists necessarily* and therefore requires no further explanation of its own existence.

56. Baggott, *Farewell to Reality*; Gordon, “Inflationary Cosmology and the String Multiverse,” 75-103; Gordon, “Balloons on a String,” 558-601; Lee Smolin, *The Trouble with Physics: The Rise of String Theory, the Fall of a Science, and What Comes Next* (New York: Houghton Mifflin Company, 2006); Alexander Unzicker and Sheilla Jones. *Bankrupting Physics: How Today's Top Scientists Are Gambling Away Their Credibility* (New York: Palgrave Macmillan, 2013); Peter Woit, *Not Even Wrong: The Failure of String Theory and the Search for Unity in Physical Law* (New York: Basic Books, 2006).

57. Natalie Wolchover, “Supersymmetry Fails Test, Forcing Physics to Seek New Ideas,” *Scientific American Online*, accessed June 30, 2017, <https://www.scientificamerican.com/article/supersymmetry-fails-test-forcing-physics-seek-new-idea/>; Lewis and Barnes, *A Fortunate Universe*, 63.

In short, multiverse cosmologies only make sense within the context of theism,<sup>58</sup> but this very theistic context renders multiverse theories *unnecessary* for understanding the design parameters of our universe.

To conclude this part of our discussion, it is fair to say that Christians may take considerable encouragement from contemporary cosmology—the implausible machinations of materialist research programs notwithstanding—since it points to a universe that has a beginning requiring a transcendent cause, and it manifests multiple properties that are fine-tuned for life and ultimately require intelligent design for their explanation.

### **§3. Quantum Physics and the Necessity of Divine Action<sup>59</sup>**

We have had reason to mention at a number of junctures so far that quantum physics is sometimes portrayed as giving evidence that the principle of sufficient reason/causality—the requirement that every contingent event have an explanation—is false. We have also remarked that drawing this conclusion is inadvisable. It is now time to take a closer look at how quantum physics captures the causal incompleteness of the material realm and at the implications of providing causal closure and restoring metaphysical coherence to the universe by the only reasonable means available: continuously operative transcendent causation. But to set the stage for this argument, we need to learn a little bit about the historical development of quantum mechanics.

#### **A Quantum of History**

Quantum theory—which is a pillar of modern physics that includes quantum mechanics and various quantum field theories—is the mathematical theory describing the behavior of reality at the atomic and sub-atomic level. At dimensions this small, the world behaves very differently than the world of our ordinary experience. This peculiarity is a consequence of the basic quantum hypothesis: energy does not have a continuous range of values but is absorbed and radiated *discontinuously* in units

58. See, most trenchantly, Robin Collins, “The Multiverse Hypothesis: A Theistic Perspective,” in *Universe or Multiverse?*, ed. Bernard Carr (Cambridge: Cambridge University Press, 2007), 459-80; a more idiosyncratic view is offered by Don N. Page, “Does God So Love the Multiverse?” (2008), accessed June 30, 2017, <https://arxiv.org/pdf/0801.0246.pdf>.

59. This section draws heavily on Bruce L. Gordon, “A Quantum-Theoretic Argument against Naturalism,” in *The Nature of Nature: Examining the Role of Naturalism in Science*, ed. Bruce L. Gordon and William A. Dembski (Wilmington: ISI Books, 2011), 179-214; Bruce L. Gordon, “Quantum Theory, Interpretations of,” in *Dictionary of Christianity and Science*, ed. Copan, Paul *et al.* (Grand Rapids, MI: Zondervan, 2017), 551-54; and *especially* Gordon, “The Necessity of Sufficiency.” See also Bruce L. Gordon, “Maxwell-Boltzmann Statistics and the Metaphysics of Modality,” *Synthese* 133 (2002): 393-417; Bruce L. Gordon, “Ontology *Schmontology*? Identity, Individuation, and Fock Space,” *Philosophy of Science* 70 (2003): 1343-56; Bruce L. Gordon, “Idealism,” *Dictionary of Christianity and Science*, ed. Copan, Paul *et al.* (Grand Rapids, MI: Zondervan, 2017), 372-73; and Bruce L. Gordon, “Occasionalism,” *Dictionary of Christianity and Science*, ed. Paul Copan *et al.* (Grand Rapids, MI: Zondervan, 2017), 491-93.

(*quanta*) that are multiples of Planck's constant. While this quantum hypothesis was put forward by Max Planck (1858-1947) in 1900 to explain black body radiation (energy emitted by a non-reflecting body due to its own heat), the work of Albert Einstein (1879-1955), Niels Bohr (1885-1962), and others soon showed it was foundational to the whole of physics.<sup>60</sup>

The peculiarity of the quantum realm is evident in the classic *double-slit experiment* demonstrating the *wave-particle duality* of light.<sup>61</sup> To visualize the situation, consider two waves of the same size (amplitude) traveling through water in opposite directions. Each wave has a crest (its highest point) and a trough (its lowest point). When they meet, they move through each other in various phases of *superposition*. Since they have the same size, when a crest meets a crest or a trough meets a trough, it will amplify respectively to twice its height or depth, and when a crest meets a trough, each cancels the other and the water is level. The former behavior is called *constructive interference* and the latter *destructive interference*. Light exhibits these kinds of interference—manifested as closely spaced light and dark bands on a projection screen—when passed through two narrow parallel slits. So light has a wave nature. But light also knocks electrons out of a variety of metals and therefore, as Einstein's 1905 explanation of this "photoelectric effect" demonstrated, exists as packets of energy called *photons* that behave like particles. This strange quantum-mechanical wave-particle duality is displayed in the double-slit experiment. When *very* low-intensity light is directed through narrow parallel slits, an interference pattern builds up on a photographic plate one spot at a time, manifesting the wave nature of light in the emerging interference pattern and the particle nature of light in its spotty accumulation. The pattern emerges if only one photon is in the apparatus at a given time and it disappears if one of the slits is covered. So *each* photon behaves as though it passes through *both* slits and *interferes with itself*, something that, from the standpoint of classical (non-quantum) physics and our ordinary experience of the world, is impossible. What is more, matter particles display this same wave-particle

60. Jim Baggott, *The Meaning of Quantum Theory* (Oxford: Oxford University Press, 1992), 1-74; Robert P. Crease and Charles C. Mann, *The Second Creation: Makers of the Revolution in 20<sup>th</sup> Century Physics* (New York: Macmillan Publishing Company, 1986); W. Michael Dickson, "Non-Relativistic Quantum Mechanics," in *Handbook of the Philosophy of Physics, Part A*, ed. Jeremy Butterfield and John Earman (Amsterdam: Elsevier, 2007), 275-415; Bruce L. Gordon, *Quantum Statistical Mechanics and the Ghosts of Modality* (Evanston: Northwestern University, Ph.D. Dissertation, 1998), 17-249; Helge Kragh, *Quantum Generations: A History of Physics in the Twentieth Century* (Princeton: Princeton University Press, 1999); Thomas S. Kuhn, *Black-Body Theory and the Quantum Discontinuity, 1894-1912* (Chicago: University of Chicago Press, 1978); Jagdish Mehra and Helmut Reichenberg, *The Historical Development of Quantum Theory*, vols. 1-5 (New York: Springer-Verlag, 1982-1987); Abraham Pais, *Inward Bound: Of Matter and Forces in the Physical World* (Oxford: Clarendon Press, 1986); Andrew Whitaker, *Einstein, Bohr, and the Quantum Dilemma* (Cambridge: Cambridge University Press, 1996).

61. Richard P. Feynman, "Probability and Uncertainty: The Quantum-Mechanical View of Nature," *The Character of Physical Law* (Cambridge: MIT Press, 1965), 127-48; Richard P. Feynman, *The Feynman Lectures on Physics, Vol. 3: Quantum Mechanics* (Reading: Addison-Wesley Publishing Company, 1971).

duality under similar experimental conditions, as the Davisson-Germer experiment demonstrated for electrons.<sup>62</sup>

The way that quantum mechanics deals with such things is to set aside classical conceptions of motion and the interaction of bodies and to introduce acts of measurement and probabilities for observational outcomes in an *irreducible* way, that is, in a way that *cannot* be resolved by an appeal to our inability to observe what is actually happening (in fact, quantum theory shows this peculiarity is *intrinsic* to reality rather than an artifact of our limited knowledge). In classical mechanics, the state of a physical system at a particular time is completely specified by giving the precise position and momentum of all its constituent particles, after which the equations of motion determine the state of the system at all later times. In this sense, classical mechanics is *deterministic*. But quantum mechanics does *not* describe systems by states in which particle position and momentum, for example, have simultaneously defined values. Instead, the state of the system is described by an abstract mathematical object called a *wavefunction*.<sup>63</sup> As long as the system is *not* being measured, the wavefunction develops deterministically through time, but it only specifies the *probability* that various *observables* (like position or momentum) will, when measured, have a particular value. Furthermore, not *all* such probabilities can equal zero or one (be absolutely determinate). This fact is expressed in *Heisenberg's indeterminacy/uncertainty principle*: no mathematical description of the state of a quantum system assigns probability 1 (determinateness) to the simultaneous existence of exact values for certain “complementary” pairs of observables. The particular value resulting from the measurement of a quantum observable is therefore *irreducibly probabilistic* in the sense that no sufficient condition is provided for *this* value being observed rather than another that is permitted by the wavefunction. This is *one* sense in which quantum theory is *indeterministic*. Also, since *all* the information about a quantum system is contained in its wavefunction, no measurement of the *current* state of a system suffices to determine the value that a *later* measurement of an observable will reveal. This is *another* (related) sense in which quantum theory is *indeterministic*. Applied to the double-slit experiment, the quantum wavefunction gives a probability distribution for measurement outcomes associated with a photon being observed to hit the photographic plate in a certain region when a measurement is made. This probability distribution describes the interference pattern on the plate that results when both slits are open, even if just one photon is sent through at a time.

This way of describing physical systems has further paradoxical consequences that conform to experimental observations. Albert Einstein, Boris Podolsky

62. C. J. Davisson, “Are Electrons Waves?” *Journal of the Franklin Institute* 205, no.5 (1928): 597-623.

63. Alyssa Ney and David Z. Albert, eds. *The Wave Function: Essays on the Metaphysics of Quantum Mechanics* (Oxford: Oxford University Press, 2013).

(1896-1966), and Nathan Rosen (1909-1995) pointed out one of these paradoxes in 1935, arguing that the quantum description of physical systems must be incomplete because there are elements of reality that quantum theory does not recognize. To make this case, they considered a situation in which two quantum particles interact so as to “entangle” their spatial coordinates with each other and their linear momenta with each other.<sup>64</sup> As a result of this wavefunction entanglement, measuring either the position or the momentum for one particle instantaneously fixes the value for that same observable for the other particle, no matter how far apart they are. If one then assumes, as the 1935 paper did, that what counts as an element of reality for the second particle is independent of which measurement is performed on the first particle, then reality can be attributed to both the position *and* the momentum of the second particle since measuring the position or the momentum of the first fixes the position or the momentum of the second without disturbing it and without any signal (subject to the limiting velocity of light) having passed between them. As Einstein, Podolsky, and Rosen (EPR) put it, “[i]f, without in any way disturbing a system, we can predict with certainty (i.e., with probability equal to unity) the value of a physical quantity, then there exists an element of physical reality corresponding to this physical quantity.”<sup>65</sup> Since quantum theory does not allow the second particle to have both position and momentum simultaneously, it is incomplete.

By way of response, Bohr argued that EPR missed the point of quantum-mechanical descriptions by ignoring the *different contexts of measurement*.<sup>66</sup> He agreed that measuring *either* the position *or* the momentum of one particle would render *either* the position *or* the momentum of the other particle an element of reality, but *denied* that the results from these different experimental contexts could be *combined*. In other words, if we try to make context-independent claims about what is real in a distant system, we will violate quantum-mechanical predictions and run afoul of experiment. This amounts to the claim that *measurement* of the first particle *can constitute what is real* about the second particle, even when they are separated by a distance that would prohibit any signal (subject to the limiting velocity of light) from passing between them.

64. Albert Einstein, Boris Podolsky, and Nathan Rosen, “Can Quantum-Mechanical Description of Physical Reality Be Considered Complete?” *Physical Review* 47 (1935): 777-80; Arthur Fine, “The Einstein-Podolsky-Rosen Argument in Quantum Theory,” in *Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta (2013), accessed June 30, 2017, <http://plato.stanford.edu/entries/qt-epr/>.

65. Einstein, Podolsky, and Rosen, “Can Quantum-Mechanical Description,” 777.

66. Niels Bohr, “Can Quantum-Mechanical Description of Physical Reality Be Considered Complete?” *Physical Review* 48 (1935): 696-702.



While Bohr's attempt to justify these claims generated much confusion,<sup>67</sup> John Bell's (1928-1990) work on the EPR argument and missing elements of reality,<sup>68</sup> along with subsequent experimental tests,<sup>69</sup> have shown that Bohr was essentially correct and Einstein wrong about the completeness of quantum mechanics. As we have noted, the wavefunctions of interacting quantum systems can become entangled in such a way that what happens to one of them instantaneously affects the other, no matter how far apart they have separated. Since local effects obey the constraints of special relativity and propagate at speeds less than or equal to that of light, such instantaneous correlations are called *nonlocal*, and the quantum systems manifesting them are said to exhibit *nonlocality*. What John Bell showed is that, if quantum theory is correct, no hidden variables (empirically undetectable elements of reality) can be added to the description of quantum systems exhibiting *nonlocal* behavior that would explain these instantaneous correlations on the basis of local considerations. As indicated, subsequent experiment showed that quantum theory is correct and complete as it stands. But since all *physical* cause-and-effect relations are local, the completeness of quantum theory implies the *physical incompleteness* of reality: the universe is shot through with mathematically predictable nonlocal correlations that, on pain of experimental contradiction, have *no* physical cause.<sup>70</sup>

67. For a helpful clarification, see Hans Halvorson and Robert Clifton, "Reconsidering Bohr's Reply to EPR," in *Non-locality and Modality*, ed. J. Butterfield and T. Placek (Dordrecht: Kluwer Academic, 2002), 3-18.

68. See John S. Bell, "On the Einstein-Podolsky-Rosen Paradox," in *Speakable and Unspeakable in Quantum Mechanics* (Cambridge: Cambridge University, 1987 [1964]), 14-21; and John S. Bell, "On the Problem of Hidden Variables in Quantum Mechanics," in *Speakable and Unspeakable in Quantum Mechanics* (Cambridge: Cambridge University Press, 1987 [1966]), 1-13.

69. A. Aspect, P. Grangier and G. Roger, "Experimental Tests of Realistic Theories via Bell's Theorem," *Physical Review Letters* 47 (1981): 460-67; A. Aspect, P. Grangier and G. Roger, "Experimental Realization of Einstein-Podolsky-Rosen-Bohm Gedanken-experiment: A New Violation of Bell's Inequalities," *Physical Review Letters* 48 (1982): 91-94; A. Aspect, J. Dalibard and G. Roger, "Experimental Tests of Bell's Inequalities Using Time-Varying Analyzers," *Physical Review Letters* 49 (1982): 1804-7; M. A. Rowe, D. Kielpinski, V. Meyer, C. A. Sackett, W. M. Itano, C. Monroe, and D. J. Wineland, "Experimental violation of a Bell's inequality with efficient detection," *Nature* 409 (2001): 791-94.

70. John S. Bell, "Bertlmann's Socks and the Nature of Reality," in *Speakable and Unspeakable in Quantum Mechanics* (Cambridge: Cambridge University Press, 1987 [1981]), 139-58; Jeffrey Bub, *Interpreting the Quantum World* (Cambridge: Cambridge University Press, 1997); Robert Clifton, ed., *Perspectives on Quantum Reality: Non-Relativistic, Relativistic, and Field-Theoretic* (Dordrecht: Kluwer Academic, 1996); James T. Cushing and Ernan McMullin, eds., *Philosophical Consequences of Quantum Theory: Reflections on Bell's Theorem* (Notre Dame: University of Notre Dame Press, 1989); Gordon, "A Quantum-Theoretic Argument against Naturalism," 179-214; Hans Halvorson, "Reeh-Schlieder Defeats Newton-Wigner: On Alternative Localization Schemes in Relativistic Quantum Field Theory," *Philosophy of Science* 68 (2001): 111-33; Tim Maudlin, *Quantum Non-Locality and Relativity*, 2nd ed. (Oxford: Blackwell Publishers, 2002); Alistair Rae, *Quantum Physics: Illusion or Reality?*, 2nd ed. (Cambridge: Cambridge University Press, 2004); Michael Redhead, *Incompleteness, Nonlocality, and Realism: A Prolegomenon to the Philosophy of Quantum Mechanics* (Oxford: Clarendon Press, 1987); John A. Wheeler, "Law without Law," in *Quantum Theory and Measurement*, ed. John A. Wheeler and Wojciech H. Zurek (Princeton: Princeton University Press, 1983), 182-213.



The radicalness of nonlocality is actually deeper than this because it extends to isolated quanta as well. Stated roughly, it has been shown that if one makes the reasonable assumptions that an individual quantum can neither serve as an infinite source of energy nor be in two places at once, then that particle has *zero* probability of being found in any bounded spatial region, no matter *how* large.<sup>71</sup> In short, unobserved quanta do not exist *anywhere* in space, and so, to be honest, have no existence at all apart from measurement!<sup>72</sup> Hans Halvorson and Robert Clifton closed some minor loopholes and extended this argument by demonstrating that the Hegerfeldt-Malament result holds under even more general conditions—including when the standard relativistic assumption that there is *no* privileged reference frame is dropped.<sup>73</sup> The proper conclusion seems to be that there is no intelligible notion of microscopic material objects: particle talk has pragmatic utility in relation to measurement results and macroscopic appearances, but *no* basis in an unobserved and independent microphysical reality.

So how should we understand the relationship and transition between the microscopic and the macroscopic world? This question leads to the second famous paradox of quantum theory, *the measurement problem*, which was first described in Erwin Schrödinger's (1887-1961) famous "cat paradox" paper.<sup>74</sup> In Schrödinger's iconic example, a radioactive atom with an even chance of decaying in the next hour is enclosed in a chamber containing a cat and a glass vial of poison. If a Geiger-counter detects the radioactive decay of the atom in that hour, it triggers a relay that causes a hammer to smash the vial and release the poison, thus killing the cat; otherwise, the cat survives. After an hour, the quantum wavefunction for the whole system (atom + counter + relay + hammer + vial + cat) is in an unresolved superposition that involves the cat being neither dead nor alive. The question of *where* and *how* the superpositions in the wavefunction "collapse" into a determinate result is the essence of the measurement problem. Is the determinate result a consequence of some special random process? Is it due to the quantum system's interaction with a macroscopic measurement device? Is it somehow connected to the *act* of observation itself? Is determinateness perhaps not manifested until the result is recognized by a *conscious*

71. G. C. Hegerfeldt, "Remark on Causality and Particle Localization," *Physical Review D* 10 (1974): 3320-21; David Malament, "In Defense of Dogma: Why There Cannot Be a Relativistic Quantum Mechanics of (Localizable) Particles," in *Perspectives on Quantum Reality: Non-Relativistic, Relativistic, and Field-Theoretic*, ed. Robert Clifton (Dordrecht: Kluwer Academic Publishers, 1996), 1-9.

72. Maria Fuwa, Shuntaro Takeda, Marcin Zwierz, Howard Wiseman, and Akira Furusawa, "Experimental Proof of Nonlocal Wavefunction Collapse for a Single Particle Using Homodyne Measurement," in *Frontiers in Optics* (Tuscon: *Optical Society of America Technical Digest*, paper FW2C.3, 2014), accessed June 30, 2017, <https://arxiv.org/pdf/1412.7790v1.pdf>.

73. Hans Halvorson and Robert Clifton, "No place for particles in relativistic quantum theories?" *Philosophy of Science* 69 (2002): 1-28.

74. Erwin Schrödinger, "Die gegenwärtige Situation in der Quantenmechanik." *Naturwissenschaften* 23 (1935): 807-12, 823-28, and 844-49.

observer? This issue arises because every quantum wavefunction is expressible as a superposition of different states in which the thing it describes, say an alpha particle that could be ejected from an atomic nucleus, fails to *possess* the properties specified by those states. At any given time, then, some features of a quantum object occupy an ethereal realm between existence and non-existence. Nothing subject to a quantum description *ever* has simultaneously determinate values for *all* its associated properties. And these ethereal superpositions percolate upward into the macroscopic realm because anything composed of quanta is always also intrinsically in a superposition of states, even though destructive interference (what physicists call *environmental decoherence*) may give the appearance that the wavefunction has “collapsed” into the single reality we observe.<sup>75</sup> What is more, under special conditions in the laboratory, we can create *macroscopic* superpositions. A clear example is provided by Superconducting Quantum Interference Devices (SQUIDS). SQUID states have been combined in which over a billion electrons move in a clockwise direction around a small superconducting ring, while another billion or more electrons simultaneously move around the ring in an anti-clockwise direction, meaning that *the two incompatible currents are in superposition*.<sup>76</sup> With respect to this macroscopic quantum realization superposing classically incompatible states, the pressing question is: in what direction are the electrons *supposed* to be moving? Which of these classically incompatible macroscopic states is supposed to be the *real* one?

So it is that quantum theory raises fundamental questions about the coherence of material identity, individuality, and causality that pose a *prima facie* problem for naturalistic metaphysics: if material reality is sufficient unto itself, as metaphysical naturalists insist, then, provided that quantum theory is correct, in *what* does the *intrinsic* substantial nature of material reality consist? What is more, given the irreducibly probabilistic nature of quantum outcomes and their demonstrable nonlocality, and given relativistic constraints on material causality, in *what* does the *causal integrity* and *sufficiency* of material reality consist? Why, in naturalistic metaphysics, if quantum outcomes lack any material explanation, does the physical universe cohere at all, let alone in a way that makes science possible? Efforts abound

75. Guido Bacciagaluppi, “The Role of Decoherence in Quantum Mechanics,” in *Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta (2012), accessed June 30, 2017, <https://plato.stanford.edu/entries/qm-decoherence/>; E. Joos, H. D. Zeh, C. Kiefer, D. Giulini, J. Kupsch, and I. O. Stametescu, eds., *Decoherence and the Appearance of a Classical World in Quantum Theory*, 2nd ed. (Berlin: Springer, 2003); N. O. Landsman, “Between Classical and Quantum,” in *Handbook of the Philosophy of Physics, Part A*, ed. Jeremy Butterfield and John Earman (Amsterdam: Elsevier, 2007), 417-553; Maximilian Schlosshauer, *Decoherence and the Quantum-to-Classical Transition* (Berlin: Springer-Verlag, 2007); W. H. Zurek, “Decoherence and the Transition from Quantum to Classical – Revisited,” *Los Alamos Science* 27 (2002): 2-25, accessed June 30, 2017, <https://arxiv.org/ftp/quant-ph/papers/0306/0306072.pdf>.

76. Joey Lambert, “The Physics of Superconducting Quantum Interference Devices” (2008), accessed June 30, 2017, [http://www.physics.drexel.edu/~bob/Term\\_Reports/Joe\\_Lambert\\_3.pdf](http://www.physics.drexel.edu/~bob/Term_Reports/Joe_Lambert_3.pdf); see also Baggott, *Farewell to Reality*, 55.

to interpret quantum phenomena in a way consistent with a naturalistic worldview, so we turn now to a consideration of the primary strategies and their inadequacies.

### **Several Quanta of Discontent: The Failure of Naturalistic Interpretive Strategies**

Various solutions have been and continue to be offered to the fundamental puzzle these quantum paradoxes pose: how is it even *possible* for the world to be the way that quantum theory describes? These solutions constitute different *interpretations* of quantum theory that cannot often be distinguished from each other on experimental grounds because they usually do not have decisively distinct experimental consequences. We will briefly consider six such interpretations—the Copenhagen interpretation, the de Broglie-Bohm nonlocal hidden variable interpretation, the many worlds interpretation, the Ghirardi-Rimini-Weber spontaneous collapse interpretation, the quantum logical interpretation, and instrumentalism—and, by noting their conceptual shortcomings, show how a theistic variant of the Copenhagen interpretation brings metaphysical completion to quantum theory so as to resolve the fundamental puzzle.

The Copenhagen interpretation of quantum mechanics (so-called because of its association with Niels Bohr’s Institute for Theoretical Physics at the University of Copenhagen) has been regarded as the “official” or “orthodox” interpretation since the late 1920s when the consensus formed that Einstein had lost the debate with Bohr.<sup>77</sup> This interpretation is hardly uniform—it includes the initial concepts hashed out by Niels Bohr (1885-1962), Werner Heisenberg (1901-1976), Max Born (1882-1970), Wolfgang Pauli (1900-1958), John von Neumann (1903-1957), Paul Dirac (1902-1984), and others along with their positivistic reconstructions;<sup>78</sup> it includes the observer-centered and consciousness-related interpretations of von Neumann, Wigner, and Wheeler;<sup>79</sup> and it also includes the more recent “modal” interpretations

77. For an overview see Bub, *Interpreting the Quantum World*, 189-211; Jan Faye, “Copenhagen Interpretation of Quantum Mechanics,” in *Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, accessed June 30, 2017, <https://plato.stanford.edu/entries/qm-copenhagen/>; Dugald Murdoch, *Niels Bohr’s Philosophy of Physics* (Cambridge: Cambridge University Press, 1987).

78. Niels Bohr, *Atomic Theory and the Description of Nature* (Cambridge: Cambridge University Press, 1934); Niels Bohr, *Essays 1932-1957 on Atomic Physics and Human Knowledge* (Woodbridge: Ox Bow, 1958); Werner Heisenberg, *Physics and Philosophy: The Revolution in Modern Science* (New York: Harper & Row, 1958); Werner Heisenberg, “Quantum Theory and Its Interpretation,” in *Niels Bohr: His Life and Work as Seen by his Friends and Colleagues*, ed. S. Rozental (New York: Wiley Interscience, 1967), 94-108.

79. John Von Neumann, *Mathematische Grundlagen der Quantenmechanik* (Berlin: Springer, 1932), trans. R. T. Beyer as *Mathematical Foundations of Quantum Mechanics* (Princeton: Princeton University Press, 1955); Eugene Wigner, “Remarks on the Mind-Body Question,” in *The Scientist Speculates*, ed. I. J. Good (London: Heinemann, 1961), 284-301; Wheeler, “Law without Law,” 182-213.

of Healey and van Fraassen.<sup>80</sup> More often than not, however, its advocates adhere to variations on a set of core ideas: (1) quantum theory provides a *complete* description of physical systems (or what we can know about them) at the atomic and sub-atomic level, thus making nature (or our knowledge of it) irremediably causally *incomplete* and therefore irreducibly indeterministic; (2) the square of the amplitude of the wavefunction gives the probability of associated measurement outcomes (the Born Rule); (3) obtaining measurement results presupposes the existence of a classical (non-quantum) world of measurement devices; (4) quantum mechanics should recover the predictions of classical mechanics in the limit where increasingly large numbers of quanta are involved<sup>81</sup>—a modified version of the “correspondence principle” advocated by Bohr;<sup>82</sup> (5) for quantum properties like position and momentum that do not have simultaneous values,<sup>83</sup> the measurement process is *contextual* since the classical world of measuring devices requires mutually exclusive (*complementary*) experimental arrangements (this is Bohr’s “principle of complementarity”); and (6) while every physical system can in principle be treated as quantum-mechanical, since quantum measurement requires a classical frame of reference provided by the measurement apparatus, not all systems can be treated as quantum-mechanical *simultaneously*.

The Copenhagen interpretation, taken as a realistic and *purely physical explanation* of quantum phenomena, has an intractable difficulty. The completeness of quantum theory entails the causal incompleteness and indeterministic character of physical reality—as evidenced by nonlocality and the irreducibly probabilistic results of quantum measurements—and if the physical world is all that is recognized to exist, then the absence of a physical explanation for nonlocal correlations and for irreducibly probabilistic quantum outcomes forces us to conclude that innumerable events in the physical realm happen without a sufficient cause and thus for no reason at all. But then by some miracle, individual events without a cause occur with a frequency that conforms to a probability distribution. By a similar miracle, events that cannot be causally connected nonetheless exhibit predictable correlated behavior, functioning as *random devices in harmony*. We are thus confronted with a situation in which the causal structure of the physical world is metaphysically incomplete and insufficient to explain quantum phenomena, but in virtue of a prior metaphysical commitment to naturalism, no non-naturalistic (transcendent) explanation is permitted. In short,

80. Richard Healey, *The Philosophy of Quantum Mechanics* (Cambridge: Cambridge University Press, 1989); Bas C. Van Fraassen, *Quantum Mechanics: An Empiricist View* (Oxford: Clarendon Press, 1991).

81. David Bohm, *Quantum Theory* (New York: Prentice-Hall, 1951), 31.

82. Alisa Bokulich, “Bohr’s Correspondence Principle,” in *Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta (2010), accessed June 30, 2017, <https://plato.stanford.edu/entries/bohr-correspondence/>.

83. Hans Halvorson, “Complementarity of Representations in Quantum Mechanics,” *Studies in History and Philosophy of Modern Physics* 35 (2004): 45-56.

Copenhagen orthodoxy, framed in a purely physical context, entails a denial of the *principle of sufficient reason* (PSR) understood as the general maxim that *every contingent event has an explanation*.

But denying the PSR, so understood, has consequences that undermine the very possibility of doing science.<sup>84</sup> Why? Suppose, among all of the events that happen in the universe, there are countless many that happen without cause or reason. If this were true, we would have no principled way of telling which events were caused and which were not, for events that *appeared* to have a cause might, in fact, lack one. Our current perceptual states, for example, might have no explanation, in which case they would bear no reliable connection to the way the world is. So if the PSR were false, we could never have any confidence in our cognitive states. In short, we would be saddled with an *intractable skepticism*. Furthermore, if the PSR failed for some event, there would be no objective probability for the occurrence of that event, because there would be no basis on which to make a calculation of probability. But without an evaluative basis, we could not even claim that violations of the PSR were improbable. Since we decide on the credentials of scientific explanations by comparing them with their competitors, and “no explanation” would then be an inscrutable competitor for *every* proposed explanation, we would be unable to decide whether there is a scientific explanation for *anything* that happens!<sup>85</sup> So denial of the PSR is a science-killer that opens the door to an irremediable skepticism. If we were to accept a version of Copenhagen orthodoxy, then, the absence of a physical explanation for nonlocal correlations and individual quantum outcomes, especially in light of their occurrence in seemingly miraculous conformity to a probability distribution, would point to the rational necessity of a *non-physical explanation* for quantum phenomena. We will return to this theme momentarily.

84. See Pruss, *The Principle of Sufficient Reason*; Pruss, “Leibnizian Cosmological Arguments.”

85. This consequence cannot be mitigated by suggesting that testing can distinguish between those cases where there is no explanation and those where there is. No test can distinguish between the case in which an event *appears* to have been caused when in fact it just happened and the case in which it *actually* was caused, for the *appearance* that something was actually caused may itself be something that lacks explanation. This metaphysical situation is further complicated, if the PSR is false, by the skeptical possibility that our perception that an event has occurred that has such-and-such a cause might itself lack a cause, and our beliefs about the world may therefore have no basis in reality. The PSR is a necessary metaphysical truth that we know *a priori*; it is a precondition of all knowledge and of the intelligibility of the world.

A second interpretation of quantum theory is the de Broglie-Bohm nonlocal hidden variable theory, sometimes simply called “Bohmian mechanics.”<sup>86</sup> Bohmian mechanics attempts to restore causality to quantum phenomena by privileging position as an observable and introducing either a “guidance equation” or a “quantum potential field” that gives determinate trajectories to all of the constituents of a quantum system. While this sounds good in theory, there are intractable problems with the proposal. First of all, even though the proposal solves the measurement problem in ordinary (non-relativistic) quantum mechanics, neither the quantum potential field nor the guidance equation carry energy-momentum, so they act in a way that is both *undetectable* and *non-mechanical* and hence cannot, in principle, provide a *causal* explanation of interactions among particle locations. Nonlocal correlations among spatiotemporally located particles are *described*, but not *explained*. Furthermore, when the attempt is made, as it must be, to extend Bohmian mechanics to incorporate relativity theory and quantum field theory, fatal theoretical inadequacies arise:<sup>87</sup> (1) the quanta associated with relativistic pilot waves can travel faster than light and backwards in time; (2) the numbers of quanta do not vary in field interactions as experiment demands and standard quantum field theory describes; (3) unlike standard quantum field theory, Bohmian field theory does not predict or explain the existence of antimatter; and (4) relativistic Bohmian field theory reintroduces the measurement problem and makes it unsolvable. All things considered, therefore, the interpretation must be judged a failure.

86. John S. Bell, “Beables for Quantum Field Theory,” in *Speakable and Unspeakable in Quantum Mechanics* (Cambridge: Cambridge University Press, 1987 [1984]), 173-80; David Bohm, “A Suggested Interpretation of the Quantum Theory in Terms of ‘Hidden’ Variables, I and II,” *Physical Review* 85 (1952): 166-193 (reprinted in *Quantum Theory and Measurement*, ed. John A. Wheeler and Wojciech H. Zurek [Princeton: Princeton University Press, 1983], 369-396); David Bohm, *Wholeness and the Implicate Order* (London: Routledge, 1980); David Bohm and Basil Hiley, *The Undivided Universe: An Ontological Interpretation of Quantum Theory* (London: Routledge, 1993); James T. Cushing, *Quantum Mechanics: Historical Contingency and the Copenhagen Hegemony* (Chicago: University of Chicago Press, 1994); James T. Cushing, Arthur I. Fine, and Sheldon Goldstein, eds., *Bohmian Mechanics and Quantum Theory: An Appraisal* (Dordrecht: Kluwer Academic Publishers, 1996); Sheldon Goldstein, “Bohmian Mechanics,” in *Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta (2013), accessed June 30, 2017, <https://plato.stanford.edu/entries/qm-bohm/>; Simon Saunders, “The ‘Beables’ of Relativistic Pilot Wave Theory,” in *From Physics to Philosophy*, ed. Jeremy Butterfield and Constantine Pagonis (Cambridge: Cambridge University Press, 1999), 71-89.

87. Saunders, “The ‘Beables’ of Relativistic Pilot Wave Theory,” 71-89.



A third approach is known as the “many worlds interpretation” (MWI) of quantum theory.<sup>88</sup> Its solution to the measurement problem pursues a drastic course by denying wavefunction collapse and asserting instead that *every* possible quantum outcome in the entire history of the universe *has been realized* in a *different branch* of the “universal wavefunction” that defines an ultimate and exhaustive collection of parallel realities. Everything that could happen, quantum-mechanically speaking, has happened and will happen, but since each of us splits into multiple parallel selves with every branching of the universe catalyzed by different quantum outcome possibilities, we each only ever observe those outcomes in branches of the universal wavefunction that are part of the personal history of that version of ourselves.

Aside from its implausibility and, from a Christian perspective, the perfect bollix it makes of human identity and moral responsibility, of the doctrines of the incarnation and the atonement, and of both individual and corporate eschatology (to name just a few things), the MWI also faces intractable theoretical problems. The first difficulty is that there are infinitely many ways to express the universal wavefunction as a superposition of component waves and the branching that takes place in the universal wavefunction depends on which expression (basis) is chosen. So which way of building the universal wavefunction is to be preferred? This difficulty, known as the “preferred basis problem”, reveals that the branching process itself is completely arbitrary from a mathematical standpoint and therefore, from the abstracted point of view presupposed by the MWI, not reflective of any physical reality. The second difficulty lies in its treatment of quantum probabilities. Suppose that a quantum event has two possible outcomes with unequal probabilities, say 1/3 and 2/3. Since, according to the MWI, *both outcomes occur* in different branches of the universal wavefunction, how can their probabilities be different? In fact, does not *everything* happen with absolute certainty (probability one)? If we follow the suggestion of Deutsch<sup>89</sup> and Wallace<sup>90</sup> and say that quantum probabilities reflect how we should decide to bet about which universe we will find ourselves in, then, as

88. David Z. Albert, *Quantum Mechanics and Experience* (Cambridge: Harvard University Press, 1992); Baggott, *Farewell to Reality*, 211-21; David Deutsch, “Quantum theory of probability and decisions,” *Proceedings of the Royal Society of London A* 455 (1999): 3129-37; Bryce S. DeWitt and Neil Graham, eds., *The Many-Worlds Interpretation of Quantum Mechanics* (Princeton: Princeton University Press, 1973); Hugh Everett III, “‘Relative State’ Formulation of Quantum Mechanics,” *Reviews of Modern Physics* 29 (1957): 454-62; Simon Saunders, “Physics,” in *The Routledge Companion to Philosophy of Science*, 2nd ed., ed. Martin Curd and Stathis Psillos (New York: Routledge, 2014), 645-58; S. Saunders, J. Barrett, A. Kent, and D. Wallace, eds., *Many Worlds? Everett, Quantum Theory, & Reality* (Oxford: Oxford University Press, 2010); Lev Vaidman, “Many Worlds Interpretation of Quantum Mechanics,” in *Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta (2014), accessed June 30, 2017, <https://plato.stanford.edu/entries/qm-manyworlds/>; David Wallace, “Everettian Rationality,” *Studies in History and Philosophy of Modern Physics* 34 (2003): 87-105.

89. Deutsch, “Quantum theory of probability and decisions,” 3129-37.

90. Wallace, “Everettian Rationality,” 87-105.

David Baker<sup>91</sup> has argued, we land in vicious circularity, for talk of probabilities in the many worlds scenario assumes the existence of a preferred basis that *only* comes about through decoherence of the wavefunction, which is *itself* an irreducibly probabilistic phenomenon. Furthermore, to paraphrase David Albert,<sup>92</sup> what needs to be explained about quantum theory is the empirical frequency of the outcomes we actually experience, *not* why, if we held radically different convictions about the nature of the world than we actually do, we would still place bets in accordance with the Born Rule. And to this observation we may add that since there are no unrealized outcomes, in innumerable branches of the universal wavefunction we will come to reject the Born Rule (or never formulate it) as a betting strategy because what it proclaims to be the most probable outcome *never* happens! The MWI thus fails for multiple reasons.<sup>93</sup>

A fourth interpretation that has been growing in popularity is the spontaneous collapse theory of Ghirardi, Rimini, and Weber, often simply called GRW theory.<sup>94</sup> The basic idea is that quantum-mechanical descriptions should be supplemented by random, infinitesimally small fluctuations which, with extremely high probability, localize the wavefunction to a specific region. While this postulation is *ad hoc*, Ghirardi's approach is nonetheless similar to Bohm's in emphasizing the density of matter to make the theory as "physical" as possible. The problem is that it cannot be rendered compatible with relativity theory or extended to the treatment of quantum fields in this form. When the effort is made to extend GRW theory to relativistic quantum fields by replacing matter (mass-density) with "flash events,"<sup>95</sup> the theory remains radically non-local and has the additional drawback of eliminating the possibility of particle interactions and thus any physics of interest.<sup>96</sup> Finally, there

91. David Baker, "Measurement Outcomes and Probability in Everettian Quantum Mechanics," *Studies in History and Philosophy of Modern Physics* 38 (2007): 153-69.

92. David Albert, "Probability in the Everett Picture," in *Many Worlds? Everett, Quantum Theory, & Reality*, ed. Simon Saunders, Jonathan Barrett, Adrian Kent, and David Wallace (Oxford: Oxford University Press, 2010), 355-68.

93. But see Simon Saunders *et al*, *Many Worlds?* (2010) for extensive polemics.

94. See John S. Bell "Are There Quantum Jumps?" in *Speakable and Unsayable in Quantum Mechanics* (Cambridge: Cambridge University Press, 1987), 201-12; A. Cordero, "Are GRW tails as bad as they say?" *Philosophy of Science* S66 (1999): S59-S71; Dickson, "Non-Relativistic Quantum Mechanics," 376-81; G. C. Ghirardi, "Collapse Theories," in *Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta (2016), accessed June 30, 2017, <https://plato.stanford.edu/entries/qm-collapse/>; G. C. Ghirardi, A. Rimini, and T. Weber, "Unified Dynamics for Microscopic and Macroscopic Systems," *Physical Review D* 34 (1986): 470-91; Simon Saunders, "Physics," 645-58; Roderich Tumulka, "A Relativistic Version of the Ghirardi-Rimini-Weber Model," *Journal of Statistical Physics* 125 (2006): 821-40; Roderich Tumulka, "On spontaneous wave function collapse and quantum field theory," *Proceedings of the Royal Society of London A* 462 (2006): 1897-1908.

95. Tumulka, "A Relativistic Version," 821-40; Tumulka, "On spontaneous wave function collapse," 1897-1908.

96. Thomas Ryckman, "Review of William Lane Craig and Quentin Smith, eds., *Einstein, Relativity and Absolute Simultaneity*," *Notre Dame Philosophical Reviews: An Electronic Journal* (2010.09.20), accessed June 30, 2017, <http://ndpr.nd.edu/news/24498-einstein-relativity-and-absolute-simultaneity/>.

are no versions of the theory in which the collapse is complete, with the consequence that all “material” objects have low-density copies at multiple locations, the presence and effect of which linger forever in the GRW wavefunction.<sup>97</sup> In short, GRW theory does not succeed in restoring material causality (locality), physical substantiality, or spatiotemporal uniqueness to quantum phenomena, and thus makes no real progress toward resolving the “paradoxes” of quantum theory.<sup>98</sup>

The quantum-logical interpretation<sup>99</sup> is the fifth attempt to provide realistic interpretation of quantum theory we will consider. Its fundamental premise is that the paradoxes of quantum theory are resolved if we change the logic we use to analyze the world, for example, by modifying the formal structure of classical logic to conform to the algebra of observables in quantum mechanics, or by introducing a third truth-value that is neither true nor false. Of this proposal only two things need be said. The first is that one does not obviate the paradoxes of quantum mechanics by shifting the venue of discussion from the strangeness of the world to a logical structure that embodies that very strangeness. This is not a solution to the problem; it is a redescription of the problem in a different mathematical vocabulary. The second point that needs to be made is that, even if one were to adopt a non-classical logic to analyze propositions about quantum-mechanical reality, the systemic properties of that non-classical logic could only be explored using the tools of classical logic. And as regards its application, in any given situation, either you use quantum logic or you don’t, and if you do, you are either correct or incorrect to do so, and the conclusions you reach will be either true or false. In short, quantum logic can never replace classical logic and, while a useful tool for exploring the logical structure of quantum theory, it is yet another description of the quantum paradoxes, not an explanation of them.

Given the difficulties of interpreting quantum theory realistically, perhaps, as a last resort, we would be better off taking an anti-realist and instrumentalist attitude toward it. This approach treats the theory as a tool for generating predictions about experimental outcomes while denying it tells us anything about the nature of reality. On this view, quantum theory is a mathematical “black box” for successful

97. Cordero, “Are GRW tails as bad as they say?” S59-S71; Dickson, “Non-Relativistic Quantum Mechanics,” 376-81.

98. Unfortunately, Alvin Plantinga indicates some sympathy for GRW theory in *Where the Conflict Really Lies*, 95-97, 115-17; needless to say, I think he is mistaken to do so.

99. G. Birkhoff, and J. von Neumann, “The Logic of Quantum Mechanics,” *Annals of Mathematics* 37 (1936): 823-43; W. Michael Dickson, “Quantum Logic is  $\text{Alive} \wedge (\text{It is True} \vee \text{It is False})$ ,” *Philosophy of Science* 68 (2001): S274-S287; Peter Gibbins, *Particles and Paradoxes: The Limits of Quantum Logic* (Cambridge: Cambridge University Press, 1987), 126-67; Clifford Hooker, ed., *The Logico-Algebraic Approach to Quantum Mechanics*, vols. I and II (Dordrecht: D. Reidel, 1975 and 1979); Hilary Putnam, “How to Think Quantum-Logically,” *Synthese* 29 (1974): 55-61; Hilary Putnam, “The Logic of Quantum Mechanics,” in *Matter and Method: Philosophical Papers, Volume I* (Cambridge: Cambridge University Press, 1979), 174-97; Willard V. O. Quine, “Two Dogmas of Empiricism,” *The Philosophical Review* 60 (1951): 20-43; Hans Reichenbach, *Philosophic Foundations of Quantum Mechanics* (Berkeley: University of California Press, 1944), 144-66.

predictions, but is devoid of any explanatory value. Is this a tenable approach? It is true that, without an interpretation of some sort, the mathematics of quantum theory just describes the behavior of the micro-world without any suggestion of explaining it. But to prescind from the task of interpretation simply because the phenomena the mathematics describes are resistant to a coherent *physical* explanation seems mere avoidance behavior. The *facts* of quantum behavior are not and cannot be disputed by instrumentalists: the quantum world exhibits measurable nonlocal correlations and individual outcomes that lack sufficient physical causes. These facts beg explanation and the instrumentalist strategy is simply to embrace antirealism and reject explanatory demand rather than deal with the intractability of physical explanations for such phenomena.

On pain of denying the principle of sufficient reason and putting all of science and human knowledge in jeopardy, *some* explanation for these phenomena must exist in spite of the increasingly clear recognition that no physical explanation, in principle, is possible. To review and expand on the bases for this conclusion we note that: (1) no physical explanation of nonlocal quantum correlations is possible under relativistic constraints; (2) the non-localizability of individual particles apart from measurement is incompatible with them having intrinsic substantial existence; (3) quantum fields exhibit states of superposition of contradictory numbers of quanta that make the individual substantiality of these quanta impossible;<sup>100</sup> (4) the stability of macroscopic appearances is an artifact of destructive interference (environmental decoherence) in which still extant yet phenomenologically suppressed macroscopic superpositions persist and for which, given the metaphysical *unity* of reality in contrast to the many worlds hypothesis, has material *insubstantiality* as a necessary condition; (5) macroscopic superpositions have been and can be created under

100. Aside from the intractability (nay, *impossibility*) of constructing substantial identity conditions on the basis of a quantum field ontology, there is good reason to think that field ontologies are as inadequate as particle ontologies for interpreting QFT: see David Baker, "Against Field Interpretations of Quantum Field Theory," *British Journal for the Philosophy of Science* 60, no.3 (2009): 585-609, accessed June 30, 2017, <http://philsci-archive.pitt.edu/4350/1/AgainstFields.pdf>. Nonetheless, considering various approaches to constructing ontological interpretations of QFT helps us appreciate the unworkability of materialist metaphysics in this context. In this regard, the essays in Meinard Kuhlmann, Holger Lyre, and Andrew Wayne, eds., *Ontological Aspects of Quantum Field Theory* (Singapore: World Scientific, 2002) are instructive. Even so, an astute reader might think that an event ontology in the context of process metaphysics could hold promise as an interpretive strategy for QFT; with some very important provisos, I would acknowledge this possibility. The most important proviso, however, is that event ontologies are parasitic on substance ontologies since there can be no events without substantial participants *in* those events. If *nothing* participates in an event, there is no event. In the absence of material substances, however, what remains are mental events, more specifically, mental events within the perceptual world of *immaterial mental substances*. But making ontological sense of this requires placing any process-metaphysical event ontology for QFT in the context of an occasionalist quantum idealism of the sort I will soon outline. I dealt with this question more fully in an unpublished paper presented at the Pacific Division of the *American Philosophical Association* in 2005 ("Quantum Field Theory and Process Metaphysics: An Unnecessary and Problematic Union"), though I would emphasize different aspects of the discussion now.

laboratory conditions,<sup>101</sup> thus allowing the aforementioned insubstantiality to be observed directly; (6) mass, which is resistance to acceleration, is not itself intrinsic to matter and indicative of its substantiality, but rather an *artifact* of ongoing interactions between matter fields and the quantum Higgs field; and (7) in every quantum state, whether for microscopic or macroscopic systems, there will always be some elements that *fail* to have a determinate value, in other words, there will always be some elements that *fail to exist*.<sup>102</sup>

To employ an imprecise metaphor, the reality that quantum theory gives us is rather like a Hollywood set where all the buildings are façades and only one side of a structure is visible at any given time; then, when you try to open a door on the side currently visible in order to see inside the structure, you find that there's *nothing* behind it! In short, what both quantum theory and the observational evidence that gives rise to it tell us is that what we take to be the "material universe" is radically incomplete, both with respect to a material explanation of the constitution of the objects we perceive and with respect to the causal interactions of such objects with each other. The fact that *some* explanation is necessary and *no* material explanation is sufficient shows that the physical universe is *neither* a self-contained *nor* a self-sustaining entity. Rather, the universe we experience is dependent on a form of causality that *transcends* what we take to be physical and *completes* it, giving integrity to its causal structure.

### **More than a Quantum of Divine Action: The Ontological Basis for the Phenomenological Regularity of Nature**

Given the ubiquitous insufficiency of physical causation and the metaphysical and epistemic necessity of sufficient causality, how is causal closure achieved, and what does the answer to this question tell us about the nature of those things we commonly call physical "laws"? Could we, for instance, usefully explain macroscopic regularities as *emergent* properties of quantum interactions in a way that would ground material identity and physical law? It is true that we can understand such emergence in terms of the limit behavior of physical systems in two ways—the classical mechanical (CM) limit, and the classical statistical (CS) limit. While these limits are useful in seeing how quantum descriptions can give rise to classical appearances, they are

101. J. A. Dunningham, K. Burnett, R. Roth, and W. D. Phillips, "Creation of Macroscopic Superposition States from Arrays of Bose-Einstein Condensates," *New Journal of Physics* 8 (2006): 182-88, accessed June 30, 2017, <http://iopscience.iop.org/article/10.1088/1367-2630/8/9/182/pdf>; Joey Lambert, "The Physics of Superconducting Quantum Interference Devices" (2008), accessed June 30, 2017, [http://www.physics.drexel.edu/~bob/Term\\_Reports/Joe\\_Lambert\\_3.pdf](http://www.physics.drexel.edu/~bob/Term_Reports/Joe_Lambert_3.pdf).

102. In this latter regard, see also Hans Halvorson, "The Measure of All Things: Quantum Mechanics and the Soul," in *The Soul Hypothesis: Investigations into the Existence of the Soul*, ed. Mark C. Baker and Stewart Goetz (New York: Continuum, 2011), 145-46.



metaphysically unenlightening where relevant, and irrelevant in the case of nonlocal behavior.<sup>103</sup> Consider first the classical limit in which Maxwell-Boltzmann statistical behavior emerges from quantum (Bose-Einstein or Fermi-Dirac) statistics. With the standard definitions of the Poisson and commutator brackets, the CM limit of a quantum system is defined to be:

$$\lim_{\hbar \rightarrow 0} \frac{1}{i\hbar} [\hat{A}, \hat{B}] = \{A, B\}.$$

This limit is fictional, of course, because  $\hbar$  is a physical constant; nonetheless, it represents the transition between the quantum and classical descriptions of a system since classical behavior “emerges” when quantum effects are dampened to the point of negligibility. It is important to note, however, that there are still residual effects (dependent on Planck’s constant) even after the classical mechanical limit is taken, and that the underlying reality is still quantum-mechanical in character. In the second case, that of the CS limit, statistical mechanics mathematically relates the thermodynamic properties of macroscopic objects to the motion of their microscopic constituents. Since the microscopic constituents obey quantum dynamics, the correct description must in principle lie within the domain of quantum statistical mechanics. Under thermodynamic conditions of high temperature ( $T$ ) and low density ( $n$ ), however, classical statistical mechanics serves as a useful approximation. With this in mind, the CS limit may be defined as the situation represented by:

$$T \rightarrow \infty \text{ and } n \rightarrow 0.$$

These are the same conditions as those governing the applicability of the ideal gas law ( $pV = nRT$ ), so the CS limit could equally well be called the ideal gas limit. Unlike the CM limit, the conditions governing the CS limit are subject to experimental control. In respect of quantum statistical behavior, both the CM and the CS limits are continuous, so the indistinguishability arising from the permutation symmetry of the quanta is not removed, even though it is dampened. Quantum “particles” retain their indistinguishability even when their aggregate behavior can be approximated by a classical (Maxwell-Boltzmann) distribution. These observations reveal why any emergentist account of the dependence or supervenience of the macroscopic realm on the microscopic realm, while perhaps descriptively interesting, will be unenlightening as a metaphysical explanation. It is environmental decoherence (essentially, statistical damping through wave-function orthogonalization) that gives quantum-mechanical ephemera a cloak of macroscopic stability, but decoherence is *not* a real solution to the measurement problem. The apparent solidity of the world of our experience is a mere epiphenomenon of quantum statistics; the underlying

103. Gordon, “Maxwell-Boltzmann Statistics and the Metaphysics of Modality,” 393-417.



noumena retain their quantum-theoretic ephemerality while sustaining a classical macroscopic phenomenology.<sup>104</sup>

So where does this leave us in respect of an analysis of what are commonly called physical “laws”? Alvin Plantinga provides a very cogent philosophical critique of the role of necessity in accounts of physical law.<sup>105</sup> Though some philosophers have argued that natural laws are broad logical necessities similar to statements like *no equine mammals are mathematical propositions*,<sup>106</sup> there seems little to no basis for this claim. If we take Coulomb’s Law of electric charges, for instance, the fact that two like (or different) charges repel (or attract) each other with a force proportional to the magnitude of the charges and inversely proportional to the square of the distance between them gives no hint of being metaphysically necessary. We can easily conceive of a different mathematical relationship holding between the charges. This has led other philosophers to assert that the laws of nature are *contingently* necessary and to develop an account of natural laws based on this assumption.<sup>107</sup> But quite apart from the oxymoronic appearance of such a claim, no coherent account of its substance has ever been put forward. One cannot just call natural laws “contingent necessities” and expect it to be true “any more than one can have mighty biceps just by being called ‘Armstrong’,” as David Lewis famously quipped.<sup>108</sup> Finally, other advocates of natural laws as physical necessities have proposed an account of physical laws deriving from innate causal powers:<sup>109</sup> laws of nature are grounded in the essential natures of things inherent in their material substance and manifested through forces or fields that express necessary capacities or emanations from these natures and mediate or constrain physical interactions in a way that also is necessary. But again, it is difficult to see why *this* causal power must necessarily flow from the essential nature of *that* material substance. Calling it necessary or essential doesn’t make it so; we could imagine it otherwise.

104. See Gordon, “A Quantum-Theoretic Argument against Naturalism,” 190-95 for a more complete discussion of the explanatory vacuity of the concepts of supervenience and emergence in relation to the transition between the microscopic and macroscopic realms.

105. Alvin Plantinga, “Law, Cause, and Occasionalism,” in *Reason and Faith: Themes from Swinburne*, ed. Michael Bergmann and Jeffrey E. Brower (Oxford: Oxford University Press, 2016), 126-44.

106. For example, Sydney Shoemaker, “Causality and Properties,” in *Time and Cause*, ed. Peter van Inwagen (Dordrecht: D. Reidel, 1980), 109-35; Chris Swoyer, “The Nature of Natural Laws,” *Australian Journal of Philosophy* 60 (1982): 203-23; Evan Fales, *Causation and Universals* (London: Routledge, 1990); and Alexander Bird, “The Dispositionist Conception of Law,” *Foundations of Science* 10, no. 4 (2005): 353-70.

107. For example, David Armstrong, *What is a Law of Nature?* (Cambridge: Cambridge University Press, 1983); Fred Dretske, “Laws of Nature,” *Philosophy of Science* 44 (1977): 248-68; Michael Tooley, *Causation: A Realist Approach* (Oxford: Clarendon Press, 1987).

108. David Lewis, “New Work for a Theory of Universals,” *Australasian Journal of Philosophy* 61 (1983): 166.

109. For example, R. Harré and E. H. Madden, *Causal Powers: A Theory of Natural Necessity* (Oxford: Basil Blackwell, 1975); J. Bigelow and R. Pargetter, *Science and Necessity* (Cambridge: Cambridge University Press, 1990).

Even if necessitarian accounts of physical law were not philosophically intractable, however, they would still be empirically false on quantum-mechanical grounds. All of them require that physical systems and material objects objectively possess properties that are capable of being connected together in a law-like fashion. At a minimum, necessitarian theorists have to maintain that quantum systems, or their components, objectively possess properties prior to measurement, whether these properties are determinate or indeterminate (probabilified dispositions), and that it is the *objective possession* of these properties that necessitates (or renders probable) their specific behavior. But Bell's theorem demonstrates that this assumption leads to empirically false consequences in the case of both locally deterministic and locally stochastic models.<sup>110</sup> Furthermore, this assumption either leads to an ontological contradiction in the nonlocal stochastic case,<sup>111</sup> or if an undetectable privileged reference frame is invoked, succumbs to the nonlocalizability and insubstantiality of the intended possessors of the requisite properties.<sup>112</sup> What we are left with, therefore, is a situation in which there are no objective physical properties at the quantum level in which to ground necessitarian relations, and no emergentist or supervenience account of material identity that would provide a *substantial* foundation for macroscopic necessitarianism. So necessitarian theories of natural law cannot gain a foothold in fundamental physical theory and must be set aside. All that remains are so-called *regularist* accounts of natural law, which assert that while there are regularities present in the phenomenology of the world on a universal scale, there are no real *laws* of nature, that is, there is *no necessity* that inheres in the natural relationships among things or in the natural processes involving them. In short, nature behaves in ways we can count on, but it does so for no discernible *physical* reason. How do we make sense of this situation?

In dealing with this conundrum, we must first address the metaphysical coherence of regularist accounts of physical law in the context of naturalistic metaphysics. The

110. John S. Bell, "On the Einstein-Podolsky-Rosen Paradox," 14-21; John S. Bell, "On the Problem of Hidden Variables in Quantum Mechanics," 1-13; Arthur I. Fine, "Correlations and Physical Locality," in *PSA 1980*, vol. 2, ed. P. Asquith and R. Giere (East Lansing, MI: Philosophy of Science Association, 1981), 535-62; Arthur I. Fine, "Hidden variables, joint probability, and the Bell inequalities," *Physical Review Letters* 48 (1982): 291-95; Arthur I. Fine, "Joint distributions, quantum correlations, and commuting observables," *Journal of Mathematical Physics* 23 (1982): 1306-10; Michael Redhead, *Incompleteness, Nonlocality, and Realism: A Prolegomenon to the Philosophy of Quantum Mechanics* (Oxford: Clarendon Press, 1987), 71-118; Cushing and McMullin, eds., *Philosophical Consequences of Quantum Theory*; R. Clifton, D. V. Feldman, H. Halvorson, M. L. G. Redhead, and A. Wilce, "Superentangled states," *Physical Review A* 58, no. 1 (1998): 135-45.

111. Gordon, *Quantum Statistical Mechanics and the Ghosts of Modality*, 444-51; Gordon, "A Quantum-Theoretic Argument against Naturalism," 194-95; Tim Maudlin, *Quantum Non-Locality and Relativity*, 204-12.

112. Gordon, *Quantum Statistical Mechanics and the Ghosts of Modality*, 452-53; Gordon, "A Quantum-Theoretic Argument against Naturalism," 198-201; Halvorson, "Reeh-Schlieder Defeats Newton-Wigner," 111-33; Halvorson and Clifton, "No Place for Particles," 1-28; Malament, "In Defense of Dogma," 1-9.

patron saint of this approach is David Hume and the most sophisticated modern articulation of it is given by David Lewis.<sup>113</sup> In describing the regularities of our world, Lewis's theory takes the fundamental relations to be spatiotemporal: relativistic distance relations that are both space-like and time-like, and occupancy relations between point-sized things and spacetime points. Fundamental properties are then local qualities—perfectly natural intrinsic properties of points, or of point-sized occupants of points. Everything else supervenes on the spatiotemporal arrangement of local qualities throughout all of history—past, present, and future—hence “Humean supervenience.” On this view, natural regularities are simply the theorems of axiomatic deductive systems, and the best system is the one that strikes the optimal balance between simplicity and strength (informativeness). Lewis postulates this “best system” to exist as a brute fact whether we know anything about it or not. As Plantinga points out,<sup>114</sup> we have little conception of what Lewis's “best system” might look like and even less reason to think that there is a uniquely “best” such system as opposed to “a multitude of such systems each unsurpassed by any other.” We may add that Lewis's approach, as it stands, is inadequate to deal with quantal nonlocalizability, physical indeterminism, and the undoing of the causal metric of spacetime in quantum gravitational theories. Furthermore, quantum-theoretic Bell correlations, while nonlocally and instantaneously coincident, would have to be understood in Lewis's theory in terms of *local* properties manifesting *random values in harmony at space-like separation* without *any* ontological connection or explanation, everything functioning as part of an overarching system of regularities that is in some sense optimal, but which also lacks any explanation for the ongoing order it displays. In short, embracing Lewis's approach requires rejecting the PSR on a colossal scale, which, as we have seen, has among its consequences both self-defeating skepticism and the utter futility of scientific explanation. When its implications are grasped, Lewis's Humean supervenience serves as a *reductio* of itself.

Having seen that necessitarianism is untenable for quantum-theoretic reasons and that the regularist account of laws is rationally unsustainable in a naturalistic context, let's begin anew with the eminently reasonable assumption that there is a way that the world is, that we can get it right or wrong, and that science is a useful tool in helping us to get it right. In particular, when physical theory backed by experiment demonstrates that the world of our experience must satisfy certain formal structural constraints—for example, quantizability, nonlocality as encapsulated in the Bell theorems, nonlocalizability as indicated by the Hegerfeldt-Malament and Reeh-Schlieder theorems, Lorentz symmetries in spacetime, internal symmetries like isospin, various conserved quantities as implied by Noether's theorem, and so

113. David K. Lewis, *Counterfactuals* (Cambridge: Harvard University Press, 1973); Lewis, “New Work for a Theory of Universals,” 343-77; David K. Lewis, “Humean Supervenience Debugged,” *Mind* 103 (1994): 473-90.

114. Plantinga, “Law, Cause, and Occasionalism,” 130.

on—then these *formal* features of the world may be taken as strong evidence for a certain metaphysical state of affairs. At a minimum, such states of affairs entail that the *structural* constraints empirically observed to hold and represented by a given theory will be preserved (though perhaps in a different representation) in any future theoretical development. This gives expression to a generic *structural realism*.

Whether this structural realism has further ontological consequences pertaining to the actual furniture of the world (entity realism) is a matter of debate among structural realists. The *epistemic structural realist* believes that there are epistemically inaccessible material objects forever hidden behind the structures of physical theory and that all we can know are the structures.<sup>115</sup> The *ontic structural realist* eliminates material objects completely—it is not just that we only know structures, but rather that all that exists to be known are the structures.<sup>116</sup> Both versions of structural realism are deficient, though in different ways.

We have argued that quantum theory is incompatible with the existence of material substances. Given this conclusion, the epistemic structural realist is just wrong that there is a world of inaccessible material individuals hidden behind the structures that quantum theory imposes upon the world. The situation would therefore seem to default to ontic structural realism. But while the ontic structural realist is correct that there are no material objects behind the structures, his position is deficient too because there can be no structures *simpliciter* without an underlying reality that is enstructured; we cannot build castles in the air. It would seem, then, that we are in a Catch-22 situation. The challenge to making sense of quantum physics is to give an account of what the world is like when it has an objective structure that does *not*

115. John Worrall, “Structural Realism: The Best of Both Worlds?” *Dialectica* 43 (1989): 99-124; Michael Redhead, *From Physics to Metaphysics* (Cambridge: Cambridge University Press, 1995); Tian Yu Cao, *Conceptual Developments of 20th Century Field Theories* (Cambridge: Cambridge University Press, 1997); Tian Yu Cao, “Structural Realism and the Interpretation of Quantum Field Theory,” *Synthese* 136 (2003): 3-24; Tian Yu Cao, “Appendix: Ontological Relativity and Fundamentality—Is QFT the Fundamental Theory?” *Synthese* 136 (2003): 25-30; Tian Yu Cao, “Can We Dissolve Physical Entities into Mathematical Structures?” *Synthese* 136 (2003): 57-71.

116. James Ladyman, “What is Structural Realism?” *Studies in the History and Philosophy of Science* 29 (1998): 409-24; Steven French, “Models and Mathematics in Physics: The Role of Group Theory,” in *From Physics to Philosophy*, ed. J. Butterfield and C. Pagonis (Cambridge: Cambridge University Press, 1999), 187-207; Steven French, “The Reasonable Effectiveness of Mathematics: Partial Structures and the Application of Group Theory to Physics,” *Synthese* 125 (2000): 103-20; Steven French, “A Model-Theoretic Account of Representation (Or, I Don’t Know Much About Art . . . But I Know It Involves Isomorphism,” *Philosophy of Science* 70 (2003): 1472-83; Steven French, “Scribbling on the blank sheet: Eddington’s structuralist conception of objects,” *Studies in History and Philosophy of Modern Physics* 34 (2003): 227-59; Steven French, “Symmetry, Structure and the Constitution of Objects,” accessed June 30, 2017, [http://philsci-archive.pitt.edu/327/1/Symmetry%26Objects\\_doc.pdf](http://philsci-archive.pitt.edu/327/1/Symmetry%26Objects_doc.pdf); Steven French and Decio Krause, *Identity in Physics: A Historical, Philosophical, and Formal Analysis* (Oxford: Clarendon Press, 2006); Steven French and James Ladyman, “The Dissolution of Objects: Between Platonism and Phenomenalism,” *Synthese* 136 (2003): 73-77; Steven French and James Ladyman, “Remodeling Structural Realism: Quantum Physics and the Metaphysics of Structure,” *Synthese* 136 (2003): 31-56; James Ladyman and Don Ross, *Everything Must Go: Metaphysics Naturalized* (Oxford: Oxford University Press, 2007).

depend on material substances. What investigations of the completeness of quantum theory have taught us, therefore, is rather than quantum theory being incomplete, it is material reality (so-called) that is incomplete. The realm that we call the “physical” or “material” or “natural” is not self-sufficient, but dependent upon something more basic that transcends it and gives reality to it.

In light of this realization, the rather startling picture that begins to seem plausible is that preserving and explaining the objective structure of appearances in light of quantum theory requires reviving a type of phenomenalism in which our perception of the physical universe is constituted by sense-data conforming to certain structural constraints, but in which there is no substantial material reality causing these sensory perceptions. This leaves us with an ontology of minds (as immaterial substances) experiencing and generating mental events and processes that, when sensory in nature, have a *formal* character limned by the fundamental symmetries and structures revealed in “physical” theory. That these structured sensory perceptions are *not* mostly of our own individual or collective human making points to the falsity of any solipsistic or social constructivist conclusion, but it also implies the need for a transcendent source and ground of our experience. As Robert Adams points out, mere formal structure is ontologically incomplete:

[A] system of spatiotemporal relationships constituted by sizes, shapes, positions, and changes thereof, is too incomplete, too hollow, as it were, to constitute an ultimately real thing or substance. It is a framework that, by its very nature, needs to be filled in by something less purely formal. It can only be a structure *of* something of some not merely structural sort. Formally, rich as such a structure may be, it lacks too much of the reality of material thinghood. By itself, it participates in the incompleteness of abstractions. . . . [T]he reality of a substance must include something intrinsic and *qualitative* over and above any formal or structural features it may possess.<sup>117</sup>

When we consider the fact that the *structure* of reality in fundamental physical theory is merely phenomenological and that this structure itself is hollow and non-qualitative, whereas our experience is not, the metaphysical objectivity and epistemic intersubjectivity of the enstructured qualitative reality of our experience can be seen to be best explained by an occasionalist idealism of the sort advocated by George Berkeley (1685-1753) or Jonathan Edwards (1703-1758). In the metaphysical context of this kind of theistic immaterialism, the *vera causa* that brings coherent closure to the phenomenological reality we inhabit is always and only *agent* causation. The necessity of causal sufficiency is met by divine action, for as Plantinga emphasizes:

[T]he connection between God’s willing that there be light and there being light is necessary in the broadly logical sense: it is necessary in that sense that

117. Robert Adams, “Idealism Vindicated,” in *Persons: Human and Divine*, ed. Peter van Inwagen and Dean Zimmerman (Oxford: Oxford University Press, 2007), 40.



if God wills that  $p, p$  occurs. Insofar as we have a grasp of necessity (and we do have a grasp of necessity), we also have a grasp of causality when it is divine causality that is at issue. I take it this is a point in favor of occasionalism, and in fact it constitutes a very powerful advantage of occasionalism.<sup>118</sup>

Plantinga is right to emphasize the virtues of occasionalism, but he does not take his argument in the idealist direction that the quantum-theoretic evidence we have considered seems to warrant. Clearly, the philosophical and quantum-theoretic problems for necessitarianism also prohibit a secondary causation account of divine action as the metaphysical basis for natural regularities. Secondary causation requires God to have created material substances to possess and exercise, actively or passively, their own intrinsic causal powers. God acts in the *ordinary* course of nature only as a universal or primary cause that sustains the existence of material substances and their properties as secondary causes. On this view, material substances mediate God's ordinary activity in the world and function as secondarily efficient causes in their own right. Plantinga recognizes that secondary causation inherits many of the philosophical problems associated with necessitarian accounts. Beyond this, however, it also inherits the quantum-theoretic problems that render necessitarianism untenable: the inherent *insubstantiality* of fundamental quantum entities, the *inability* of emergentist accounts of macroscopic objecthood to generate substantial material individuality and identity, and the *operative incompleteness* of this reality in respect of sufficient causation. In the absence of coherent material substances and physical causality, therefore, secondary causation lacks a purchase point in fundamental physical theory. So regardless of whether God *could* have created a world in which there were secondary material causes, it is evident that *he did not do so*. This leaves us with an occasionalist account of natural regularities, which in its "weak" form, as Plantinga is at pains to argue, fares no worse than secondary causation in respect of allowing for libertarian freedom and a resolution of the problem of evil. In fact, if we take advantage of Alfred Freddoso's approach to occasionalism,<sup>119</sup> we can build libertarian freedom into its definition:

God is the sole efficient cause of every state of affairs in the universe that is not subject to the influence of freely acting creatures.

In other words, God is the only *vera causa* of every state of affairs occurring in "pure" nature, namely, that segment of the universe *not* subject to the causal influence of creatures with libertarian freedom.

In giving an account of the ontological basis for natural regularities under occasionalist idealism, then, the regularities of nature may be formulated as

118. Plantinga, "Law, Cause, and Occasionalism," 137.

119. Alfred Freddoso, "Medieval Aristotelianism and the Case against Secondary Causation in Nature," in *Divine and Human Action: Essays in the Metaphysics of Theism*, ed. Thomas V. Morris (Ithaca: Cornell University Press, 1988), 79-83.



counterfactuals of divine freedom.<sup>120</sup> Rather than understanding God's activity in terms of the divine production of certain behavior in substantial material objects, however, with the perception of the same divinely induced in our material brains, we must instead conceptualize the creaturely experience of mental phenomena as directly communicated to finite immaterial minds by God. So the natural regularities we interpret as "laws of nature" are just specifications of how God would act to produce the phenomena we experience under different complexes of conditions. More precisely, nature's nomological behavior should be understood in the following way: *if collective phenomenological conditions C were realized, all other things being equal, God would cause us to experience the phenomenological state of affairs S*. On this view, then, what we take to be material objects are mere phenomenological structures that we are caused to perceive by God and which have no non-mental reality. They exist and are given being in the mind of God, who creates them, and they are perceived by our minds as God "speaks" their reality to us. What we perceive as causal activity in nature is always and only God *communicating* to us—as immaterial substantial minds whose bodies are also phenomenological constructs—the appropriate formally structured qualitative sensory perceptions.

#### **§4. Conclusion: "In Him We Live and Move and Have Our Being"**

A careful consideration of the progress of physics since 1900 reveals that the harder we have looked at the universe's material constitution, the more ephemeral it has gotten, until in the final analysis we are left with a phenomenological reality that does not emanate from a material substratum, for material substances are shown to have no place in fundamental physical theory. The irony for the scientific materialist is palpable. In seeking an explanation for how the universe works, he turns to science and marshals his resources, restricted as they are to material objects and processes and what can be derived from them. But as he journeys deeper and deeper into the heart of matter, he finds that it dissolves and his whole worldview lacks a metaphysical foundation. Yet the phenomenological universe that constitutes his experience and ours remains, is ever so regular, and is ever so evidently not of human making, for we do not will the experiences we have—they come to us unbidden, sometimes welcome and sometimes not. As we have extracted this metaphysical picture from quantum physics and examined its implications, we have found an explanation of this surprising state of affairs—for it *requires* an explanation—in an occasionalist quantum idealism

120. Del Ratzsch, "Nomo(theo)logical Necessity," *Faith and Philosophy* 4, no. 4 (1987): 383-402; Plantinga, "Law, Cause, and Occasionalism," 126-44.

that has a strong affinity with Berkeley's occasionalist idealism.<sup>121</sup> In summary, not only is divine action *detectable* in the origin of the universe and the fine-tuning of its initial conditions, regularities, and constants, quantum physics reveals it to be *necessary* for the causal integrity and phenomenological coherence of the universe from moment to moment. Fundamental physical theory does not just reveal the mind of God to us, it reveals to us that *we live in the mind of God*. In his speech at the Areopagus (Acts 17:22-31), the Apostle Paul appropriates and recontextualizes the words of Epimenides, stating of God that "in him we live and move and have our being" (Acts 17:28a). As it turns out, this is quite *literally* true.

121. I arrived at an earlier version of this occasionalist quantum idealism about twenty years ago (Gordon, *Quantum Statistical Mechanics and the Ghosts of Modality*, 488-97), but it is encouraging to see a burgeoning interest in and advocacy of Berkeleian occasionalist idealism by a variety of Christian philosophers and theologians. See, for example, Joshua Farris, S. Mark Hamilton, and James S. Spiegel, eds., *Idealism and Christianity, Volume 1: Idealism and Christian Theology* (New York: Bloomsbury Academic, 2016); and Stephen B. Cowan and James S. Spiegel, eds., *Idealism and Christianity, Volume 2: Idealism and Christian Philosophy* (New York: Bloomsbury Academic, 2016).

## ***Paleoevil, Theodicy, and Models of Earth History***

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**Abstract:** The total amount of natural evil includes natural evil in the present world plus the natural evil of the past—including ‘paleoevil’, the natural evil inferred from the geologic record. ‘Baseline paleoevil’—paleoevil directly inferred from the geological record—is considerably greater than the natural evil observed in the present. Beyond phenomena of the present that cause suffering—such as disease, parasitism, carnivory, degenerative aging, accidental injury, death, extinction, floods, droughts, storms, tsunamis, mudflows, and avalanches—the geologic column also evidences giant meteorite impacts, supervolcanoes, and superquakes. Because the geologic column is an incomplete sample of earth history, the actual amount of paleoevil is an amplification of baseline paleoevil. How much the baseline paleoevil is amplified is dependent upon one’s view of earth history. A minimal amplification is necessary if the earth is young; an amplification by at least five orders of magnitude is required if the earth is old. Even greater amplification is required if organisms arose by biological evolution.

Augustine’s theodicy dominated most of Church History, but the only paleoevil it can explain is young-age paleoevil. Of theodicies fashioned to explain old-age paleoevil, Alvin Plantinga’s requires a fall of angels prior to that indicated in Scripture and William Dembski’s requires a judgement before sin inconsistent with a biblical view of God. Although theodicies similar to that proposed by Augustine can explain young-age paleoevil, no theodicy seems to adequately address either old-age or evolutionary paleoevil.

**Key Words:** natural evil, theodicy, Augustine, young earth, old earth, philosophy of science, Alvin Plantinga, William Dembski

### **Introduction**

Perhaps the most substantial philosophical challenge to Christianity is the problem of evil. Atheologians<sup>1</sup> claim that the existence of evil is inconsistent with belief in a good, all-powerful, all-knowing God. In response to atheological challenges, Chris-

1. A person who is a critic of Christianity.

tians have developed theodicies to argue that evil is not inconsistent with a Christian God. Some of these theodicies only address the problem of moral evil—why God permits acts of willful disobedience to Him. But not all evil is moral evil. Natural processes that lack any ability at all to choose disobedience are responsible for a substantial amount of human and animal suffering. This ‘natural evil’ is added to moral evil, thus substantially increasing the amount of evil that a Christian theodicy ought to explain.

The natural evil of the *present* world, however, may actually pale in magnitude compared to the natural evil of the past (here called ‘paleoevil’). The fossil record of the earth contains direct evidence of natural evil and processes that result in natural evil. Other than general references to natural evil prior to the fall of Adam, theodicies tend not to address the natural evil directly evidenced in the earth’s rock record. Yet, the paleoevil directly evidenced in the fossil record pales again in comparison to the paleoevil that must be *inferred* in certain interpretations of earth history. It is doubtful that any theodicy has even attempted to address the full magnitude of the paleoevil required in models of earth history created in the last couple centuries.

This article seeks to apply Christian theodicies to a fuller understanding of paleoevil. Using one type of natural evil to gain perspective on total paleoevil—namely the suffering of animals—the article will begin by introducing the nature of animal suffering in the fossil record—both that directly evidenced in the fossil record and that required in several interpretations of earth history. The article will then examine a couple of the popular theodicies to determine how effectively they explain the different levels of paleoevil required in different interpretations of earth history.

## **Paleoevil**

‘Paleoevil’ is here defined as a subset of natural evil—namely that natural evil of the past which we infer from the geologic record (the fossils and rocks of the earth). Furthermore, this article will focus on the paleoevil suffered by animals<sup>2</sup>. Although it is generally acknowledged that animals can and do suffer, very few believe that plants, fungi, protozoa, algae, or bacteria are capable of suffering. To avoid a dispute on what can and cannot suffer, and to make the project more manageable, this article is restricted to the suffering of animals that might be inferred from the geological record.

2. There is much discussion on where the line should actually be drawn between natural process that is not evil and natural process that is. Some would say that death, per se, is a natural evil, whereas others would say that death in a world of suffering is mercy, and not, at least, evil in an absolute sense. Some would say that death that provides life (e.g., the death of a plant to feed an animal or the death of an animal to feed a human) is not evil. Others would say that it is. And so the argument continues. Here, we will track only natural processes that cause animal and/or human *suffering*, as most would agree that even if pain and death may be necessary for life and to maximize the pleasure of life, suffering (pain beyond what is necessary) is not.

Paleoevil, like natural evil, can be roughly divided according to the cause of the evil into biological, climatological, geological, and astronomical natural evils. Biological natural evils would include plant and animal toxins, genetic mistakes, microorganism-caused diseases, parasitism, carnivory, and degenerative aging. Accidental injury, though not easily classified into the other categories, is included as a natural biological evil because it also causes animal suffering. Climatological natural evils would include lightning (and the wildfires lightning might ignite), extreme temperatures (sweltering or freezing), extreme precipitation (droughts or floods), and severe storms (tornadoes, hurricanes/cyclones, blizzards, *etc.*). Geological natural evils would include earthquakes and volcanic eruptions, as well as some of the events they cause (e.g., tsunamis, mudflows, landslides, environmental poisoning). Astronomical natural evils would include such things as supernova explosions and bolide impacts and the things they might generate (e.g., tsunamis, avalanches). All these things cause animal suffering.

Most of these natural evils are evidenced in the geologic record and would thus be classifiable as paleo evils. Among astronomical natural evils, there are no known evidences of nearby supernova explosions in the geological record. However, about 190 structures on the earth are currently identified as likely impact craters.<sup>3</sup> They are scattered throughout the geologic record and across the earth's continents. 50 of them are craters 10 miles or more in diameter (with an estimated energy release greater than that of the entire nuclear weapons arsenal of the world), 14 are greater than 25 miles in diameter, and 6 are in excess of 50 miles in diameter. These sorts of impacts on a planet like ours would cause extensive animal suffering across the planet.

The evidence for geological natural evils in the geological record is extensive. Volcanic activity, for example, is evidenced directly from lava flows and debris tossed out of erupting volcanoes<sup>4</sup> and indirectly from intrusive igneous rocks and hydrothermal mineral deposits.<sup>5</sup> Interestingly enough, the volcanism evidenced in the geologic record is often on a scale many times larger than the volcanism we experience today. There have been volcanic eruptions since the time of Christ that have been quite destructive (e.g., the eruptions of Pinatubo in 1991, St. Helens in 1980, Tambora in 1815, and Vesuvius in AD 79). The 1980 eruption of Mt. St. Helens, for example, pulverized more than 1/5 of a cubic mile of rock into volcanic ash, devastated over 150 square miles of forest in less than six minutes, and killed more than 50 people

3. See, for example, the Earth Impact Database: "Earth Impact Database", The Planetary and Space Science Centre, accessed January, 2017, available at <http://www.passc.net/EarthImpactDatabase/index.html>.

4. E.g., pyroclastic deposits and volcanic ash.

5. Molten rock rising towards the earth's surface 'intrudes' rocks on the way up, and cools as 'intrusive igneous rock' if it does not make it to the surface. Water released or heated up by such molten rock carries dissolved minerals that can deposit many of those minerals in hydrothermal mineral deposits.

and many animals—including more than 10,000 elk.<sup>6</sup> In the first century, in a similar-sized eruption, Vesuvius destroyed the cities of Herculaneum and Pompeii, killing perhaps 15,000 people.<sup>7</sup> In 1991, Pinatubo pulverized more than 2 cubic miles of rock into ash,<sup>8</sup> and, in 1815, Tambora pulverized roughly 22 cubic miles of rock and killed over 70,000 people.<sup>9</sup> But these eruptions pale in comparison to the eruptions of ‘supervolcanoes’ evidenced in the geologic record. Several eruptions sourced in what is now Yellowstone National Park, for example, pulverized more than 200 cubic miles of rock, covering most of what is now the United States west of the Mississippi River with volcanic ash.<sup>10</sup> Even larger eruptions must have generated the hundreds of feet of volcanic ash now evidenced in the Chinle Formation (the rocks of the Painted Desert) and the Morrison Formation (the rocks containing the dinosaurs of Dinosaur National Monument).<sup>11</sup> And even these events must have been dwarfed by the eruptions which created more than a dozen ‘Large Igneous Provinces’ found in the geologic record,<sup>12</sup> each of which contains more than 32,000 cubic miles of lava erupted in just weeks of time. If volcanic eruptions on these scales were to occur today they would cause a huge amount of animal suffering.

Earthquake activity is evidenced indirectly by landslides and directly by faults, scrapes on rocks caused by faulting, and sediments deformed by earthquake shock waves. Earthquake evidences of this nature are common throughout the geologic record. Even teasing out the earthquakes which are known to be due—or thought to be due—to volcanic or impact events, earthquake evidence abounds.<sup>13</sup> And, as in the case of volcanism, earthquake activity is evidenced in the geologic record that is many times stronger than earthquakes we experience today. Even huge earthquakes such as the one on December 26, 2004, which triggered a tsunami which in turn

6. “Mount St. Helens – From the 1980 Eruption to 2000,” U.S. Geological Survey Fact Sheet 036-00, last modified March 1, 2005, accessed June 16, 2017, available at <https://pubs.usgs.gov/fs/2000/fs036-00/>.

7. Alfonso de Franciscis, *The Buried Cities Pompeii & Herculaneum* (New York: Crescent Books, 1978).

8. “The Cataclysmic 1991 Eruption of Mount Pinatubo, Philippines,” U.S. Geological Survey Fact Sheet 113-97, last modified February 28, 2005, accessed June 16, 2017, available at <https://pubs.usgs.gov/fs/1997/fs113-97/>.

9. “Comparisons With Other Eruptions,” USGS, last modified June 25, 1997, accessed June 16, 2017, available at <https://pubs.usgs.gov/gip/msh/comparisons.html>.

10. “Questions About Yellowstone Volcanic History,” USGS, last modified July 6, 2012, accessed June 16, 2017, available at [https://volcanoes.usgs.gov/volcanoes/yellowstone/yellowstone\\_sub\\_page\\_54.html](https://volcanoes.usgs.gov/volcanoes/yellowstone/yellowstone_sub_page_54.html).

11. Eric H. Christiansen, Bart J. Kowallis, Michael J. Dorais, Garret L. Hart, Chloe N. Mills, Megan Pickard, and Eric Parks, “The Record of Volcanism in the Brushy Basin Member of the Morrison Formation: Implications for the Late Jurassic of Western North America,” *Geological Society of America Special Papers* 513 (2015).

12. Hetu Sheth, “‘Large Igneous Provinces (LIPs)’: Definition, Recommended Terminology, and a Hierarchical Classification,” *Earth-Science Reviews* 85, nos. 3-4 (2007): 117-24.

13. For example, Frank R. Effensohn, Nicholas Rast, and Carlton E. Brett, eds., *Ancient Seismites: GSA Special Paper 359* (Denver, CO: Geological Society of America, 2002).



killed more than 230,000 people, pale in comparison to the ‘superquakes’ evidenced in the geologic record. The geologic column evidences fluid evulsion structures<sup>14</sup> dozens of times larger than those produced by any earthquake known in the last 3000 years.<sup>15</sup> The geologic column evidences faults with displacements hundreds of times greater than the largest fault displacements on any earthquakes known in the last 3000 years.<sup>16</sup> Earthquakes which sever buildings from their foundations and move massive objects dozens of feet are impressive. Yet during the time that Miocene and Pliocene sediments were deposited, earthquakes on the San Andreas Fault severed mountains from off from their roots and moved them scores of miles across the landscape.<sup>17</sup> Whereas the 2004 Sumatra quake moved a 1000-kilometer slab of rock 20 meters, evidence suggests at least one paleoquake collapsed all the continental margins across the entire planet.<sup>18</sup> If earthquakes of this magnitude occurred today, they would cause considerable animal suffering across our planet.

Because they have much less direct impact on sedimentation, climatological natural evils are more difficult to recognize in the geologic record. Yet lightning can be evidenced by sediments fused by the heat of lightning strikes, and wildfires can be recognized in tree-ring studies. Variations in rainfall can be evidenced in tree-rings, ice cores, and sediment cores. Frozen carcasses evidence the effects of freezing, and salt deposits can evidence drought conditions. River overbank deposits that evidence floods and storm deposits are commonly recognized throughout the geologic record. Whereas it is difficult to infer lightning and temperature extremes in older deposits, storm activity as well as high and low extremes in rainfall are evidenced consistently in time and space throughout the entire geologic column. Events of this nature cause considerable animal suffering in the present, so climatological paleo evils have caused much animal suffering in the geologic past as well.

14. Resulting from sediments becoming ‘liquified’ by water forced out from between the grains when an earthquake shock wave causes the grains to settle closer together.

15. For example, H. L. Hilbert-Wolf and E. M. Roberts, “Giant Seismites and Megablock Uplift in the East African Rift: Evidence for Late Pleistocene Large Magnitude Earthquakes,” *PloS one* 10, no. 6 (2015) and Summer Rose Weeks and Arthur V. Chadwick, “A Prominent Seismitic in the Upper Cretaceous Lance Formation in Northeastern Wyoming as a Stratigraphic Marker,” *Geological Society of America Abstracts and Programs* 43, no. 5 (2011): 119.

16. Faults with miles of displacement are rather common in the fossil record. Although it is difficult to determine how long it took for that total displacement to occur (it could have occurred over many earthquakes over many years), many cause folding of thousands of feet of rock without any evidence that sediments were being deposited at the same time. See, for example, the monocline in Grand Canyon described in Stanley S. Beus and Michael Morales, eds., *Grand Canyon Geology* (Oxford: Oxford University Press, 1990).

17. For example, the Kingston Range: J. P. Calzia, R. J. Blakely, and R. C. Jachens, “Miocene Magmatism and Extension in Ibex Pass, Southern Death Valley, California,” *Eos* 72 (1991): 469.

18. Steven A. Austin and Kurt P. Wise, “The Pre-Flood/Flood Boundary: As Defined in Grand Canyon, Arizona and Eastern Mojave Desert, California,” in *International Conference on Creationism*, Robert E. Walsh, ed. (Pittsburgh, PA: Creation Science Fellowship, 1994).

Biological natural evils are best evidenced in fossils themselves. In contrast to plant and animal toxins which are rarely possible to identify in the fossil record, death is directly evidenced by billions of animal fossils throughout the geologic record on all continents. Extinction is directly evidenced by more than a quarter million species of fossil animals unknown in the present world.<sup>19</sup> Carnivory is nearly as pervasive, evidenced by predator designs (e.g., teeth, claws), animal remains in digestive systems or feces, body damage matching the bites of known predators, and bone growth around embedded predator teeth. Although it is very difficult to distinguish among the different causes of disease (genetic vs. parasite vs. microorganism causes), the evidence of disease (e.g., tumors) is found in animal fossils throughout the fossil record. The fossil bones of vertebrates not only commonly show evidence of disease and predation (healed tooth punctures) but also commonly show evidence of accidental injury in the form of healed bone breaks. Substantial animal suffering from a variety of biological natural evils is evidenced throughout time and space in the geological record.

### **Baseline Paleoevil**

Paleoevil which is evidenced in the manner recounted above is here defined as ‘baseline paleoevil’. More or less directly evidenced by the rocks and fossils, this is a *minimum* amount of paleoevil evidenced in the geological record. By its very nature, though, the fossil record provides an incomplete picture of the earth’s past. There are countless fossils that are buried so deeply in rocks—some miles beneath the surface—that they have never been seen and probably will never be seen. Even in the case of fossils at or near the earth’s surface, many of them are in places where they are never seen by humans, many are eroded away by weather or pulverized by being stepped on by animals. Then there are the fossils that were found in rocks now completely eroded away. The fossils and rocks known to science are only a sample of all the fossils and rocks that exist in the present, or once existed and are now gone.

How large a sample the present rocks and fossils represent is dependent upon what is believed about earth history. Some views of earth history understand the fossil record to represent a vanishingly small sample of earth history. Others suggest that most of the rocks and fossils that were formed in the earth’s past still exist on our planet today. Some views suggest that the natural evil we see in the present is a key to understanding the natural evil of the past. Others argue that paleoevil has changed in both type and magnitude throughout earth history. Because the rock and fossil record is only a sample of the earth’s past, *all* views of earth history argue that the *true* paleoevil is substantially more than the baseline paleoevil. However,

19. See, for example, Donald R. Prothero, “Fossil Record,” in *Encyclopedia of Paleontology*, R. Singer, ed. (Chicago: Fitzroy Dearborn Publishers, 1999), 490-92.

*how much more* is very much dependent upon one's view of earth history.<sup>20</sup> Three broadly different perspectives of earth history are now reviewed for their respective enhancements of paleoevil.

### Young-Age Paleoevil

Until just two or three centuries ago, most Jewish and Christian theologians understood that the creation began less than eight thousand years ago.<sup>21</sup> This was simply because the natural or naïve reading of the biblical text suggested creation occurred in a week of time, and Abraham (*circa* BC 2000) lived only two or three millennia after the creation.<sup>22</sup> This changed only after geological arguments for a much older earth began to be introduced in the late eighteenth and early nineteenth centuries. Those who continued to interpret the Bible in this 'literal' fashion continued to embrace a young age for the creation—thus continuing to accept what is here referred to as 'young-age' interpretations of earth history. A somewhat diverse set of young-age interpretations of earth history persist to the present. The nearly universal belief among these young-age interpretations is that natural evil was not in the original creation, but originated with the curse of Genesis 3. Young-age earth histories, then, claim that the animal fossil record was generated after the Fall of Man.<sup>23</sup> This requires that a huge number of fossils and a huge volume of rocks must have formed in less than eight thousand years of time. This, in turn, requires a rate of formation of rocks and fossils many, many times greater than the formation rate observed in the present (i.e., at catastrophic rates). According to a typical young-age reading of Genesis 6-9, the flood in the days of Noah began suddenly and covered the whole globe. This makes Noah's flood a catastrophic event, and a good candidate for the catastrophic formation of rocks and fossils necessary in a young-age view of earth history. Not surprisingly, then, most young-age earth histories assign much of the animal fossil record to the Genesis Flood or catastrophes following soon thereafter.

20. Some might object that it is inappropriate to measure the total amount of paleoevil that has occurred through time, for that would mean that every day that passes would increase the difficulty of evil for the Christian. But, every day that passes *does* increase the difficulty of evil for the Christian. The theodicy problem is how to reconcile the existence of evil with a God who is perfectly Good and all-powerful. Although *any* amount of evil would be a problem, the more evil there is, the more difficult the problem. And, the longer such a God waits to rid the world of that evil, the more difficult the problem.

21. Roughly 4000 B.C., based on a Masoretic chronology and roughly 5500 B.C. based on a Septuagint chronology. For an example of the pervasiveness of the belief in a young earth, see William Van Doodewaard, *The Quest for the Historical Adam: Genesis, Hermeneutics, and Human Origins* (Grand Rapids, MI: Reformation Heritage Books, 2015).

22. Based on the 'days' of Genesis 1 being the earth-rotation days of our current experience, and the genealogies of Genesis 5 and 11 being both accurate and complete.

23. From the perspective of young-age earth history, since death was not a part of the original creation and animal fossils seem to evidence animal death, God did not create the fossils in place. Young-age earth history, then, concludes that animal fossils were formed after the creation, and, in fact, after the fall of man.

In the modern world, only a vanishingly small percentage of organisms get preserved as fossils. Many plants and animals are killed and eaten by consumers. The bodies of most of the rest are consumed by scavengers, and decomposers destroy the vast percentage of the remainder. Young-age earth histories involve such a short history that conditions like the present—even collectively over the entire history of the world—would generate no appreciable rocks or fossils. However, in the midst of catastrophes, organisms can get buried quickly. Organisms get preserved as fossils at a greater frequency, the more rapidly they are buried. Young-age earth histories require such a high rate of rock formation that animal fossils and the rocks that contain them must have been produced during one or more catastrophes of astonishing magnitude.<sup>24</sup> The burial rates during the catastrophe(s) must have been so high that a very high percentage of organisms must have been preserved as fossils.<sup>25</sup> In young-age earth histories, then, the fossil and rock record we have in the present is thought to represent a substantial percentage of all the rocks and fossils that were ever formed. The paleoevil directly evidenced by those rocks and fossils, then, represents a substantial percentage of the paleoevil that occurred at the time of the catastrophe(s). Since young-age earth histories begin with a world lacking natural evil, and are only thousands of years long, relatively little paleoevil occurred during non-catastrophic periods of earth history. Overall, then, the total paleoevil inferred by young-age earth histories—what is here called ‘young-age paleoevil’—is probably within an order of magnitude of baseline paleoevil.

### **Old-Age Paleoevil**

Whereas young-age earth histories dominated Christian thought before the middle of the eighteenth century, geological arguments for an old earth began a gradual transition to old-age earth histories.<sup>26</sup> Rocks containing animal fossils were first given ages of tens of thousands, then hundreds of thousands, then millions, and, by the latter part of the nineteenth century, hundreds of millions of years. During the second half of the nineteenth century even the age of human fossils was pushed back, first to tens of thousands, and then to hundreds of thousands of years. In the twentieth century, the abundance of rare, radioactive atoms in rocks was interpreted in such a way as to push the age of the oldest animal fossils back to more than 500 million years and the oldest

24. Consistent, in turn, with geologic events evidenced in the rock record (e.g., superquakes and supervolcanoes) many times more powerful than is observed in the present.

25. This is consistent with a very high percentage of modern species being represented in the fossil record, and the number of species unique to the fossil record (roughly a quarter million) being within an order of magnitude of the number of named species in the modern world (roughly 1.8 million).

26. Examples of histories of this transition include: C. L. E. Lewis and S. J. Knell, eds., *The Age of the Earth: From 4004 BC to AD 2002* (London: The Geological Society, 2001) and Martin J. S. Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution* (Chicago, IL: University of Chicago, 2005).

human fossils back to between two and four million years.

In contrast to the limited enhancement of paleoevil inferred from young-age earth histories, the enhancement of paleoevil inferred in old-age earth histories is quite considerable. This is because the thickness of fossiliferous sediments averages less than a mile on the continents and one third of mile on the ocean bottom. Even if the average sedimentation rate was at the very low end of the observed range, one half billion years of sedimentation should generate more than 100 times that much sediment. More reasonable sedimentation rates would require one to two orders of magnitude more than that.<sup>27</sup> And this is assuming no catastrophic sedimentation (i.e., assuming no impacts, volcanoes, landslides, storms, floods, *etc.*, all of which are evidenced throughout the rock record). In an old-age interpretation of earth history, at least five orders of magnitude more rock has been produced in earth history than we have evidence of in the present. If the rocks really are as old as old-age histories suggest, baseline paleoevil is an extreme underestimate of the actual amount of paleoevil—by something in excess of five orders of magnitude.

In regards to extinction, old-age histories would suggest that rather than merely the quarter million extinctions evidenced by fossil species, there should have been something on the order of 50 *billion* extinctions<sup>28</sup>—again, roughly five orders of magnitude more than we have direct evidence. Similarly, rather than the billions of deaths that are directly observed in the fossil record, old-age earth history would require many billions of billions of deaths.<sup>29</sup> In old-age earth histories there would have been at least five orders of magnitude more carnivory, disease, and accidental injury than we have direct evidence for. There would also have been five orders of magnitude more *species* of carnivores and pathogens than we see directly evidenced in the fossil record.

For similar reasons, old-age histories require orders of magnitude more floods, droughts, storms, earthquakes, volcanoes, and meteor impacts than we see directly evidenced in the geologic record. For example, even assuming the very small cratering rates we observe in the present, in the course of animal history there should have been at least 500 impacts releasing more energy than is stored in the earth's entire nuclear weapon arsenal (rather than the 50 for which we have direct evidence). There

27. An 'order of magnitude' estimate is an estimate within a factor of ten either way, so two orders of magnitude greater is within a factor of ten of  $10^2$  greater, or between 10 and 1000 times as large.

28. This is calculated by integrating Sepkoski's Phanerozoic genera diversity curve with respect to time, multiplying by the average number of species per genus (~3), and dividing by the average species duration (~30 million years).

29. This can be derived by assuming that during its 30 million year duration, each extinct species not evidenced maintained a (conservative) average population size of 1000 and an average (conservative) lifespan of 5 years. This yields 6 billion deaths per species. 50 billion un-evidenced species would generate 300 billion billion deaths. Alternatively, if we assume there are a billion preserved fossils, then ¼ million extinct species suggests there are an average of 4000 fossils per extinct species, yielding 200 billion billion fossils if all 50 billion un-evidenced fossil species were evidenced to the same average extent.

should have been 50 impacts large enough to cause more than 75% extinction of earth species (rather than the direct evidence we have for only three impacts of this size, and five mass extinctions of this size). Even these estimates are underestimates, given that the present cratering rate appears to be smaller than the cratering rate in the past.

Along with the greater number of instances of natural evil, a greater diversity of different *types* of natural evil would also be expected in old-age histories. Furthermore, this more diverse natural evil would persist over hundreds of millions of years. The quantity of natural evil which must have occurred if old-age earth histories were true—what is here called ‘old-age paleoevil’—is difficult to estimate, but should be well over five orders of magnitude more paleoevil than baseline paleoevil.

### **Evolutionary Paleoevil**

Naturalistic evolution is another interpretation of earth history which substantially inflates estimates of paleoevil.<sup>30</sup> In conventional evolutionary theory every species is struggling for survival. It persists only if a greater percentage of its offspring survive to produce viable offspring than every other species in its vicinity. Every organism is essentially at war with its environment and adjacent organisms, making *everything* in its environs—even members of its own species—something of a natural evil to that species. In this understanding of biology, natural evil *is* the norm. In an evolutionary view, harmony, cooperation, and mutualism would be expected to be rare phenomena, even though that does *not* seem to be case in the present world.<sup>31</sup> In general, the evolutionary perspective suggests there is much more natural evil in both the present and fossil world than is directly observed. Furthermore, in an evolutionary perspective, species arise due to the natural evil of natural selection. And, if old-age earth history is assumed—which it is in biological evolution—then billions of species must not only have gone extinct in the course of earth history (as argued above), but billions of species must have come into existence in the course of earth history. Not only does an evolutionary view of earth history require organisms to experience more natural evil than is observed or inferred in other views of earth history, but tens of billions of species must have come to be by a process of natural evil not a part of any other view of earth history. The paleoevil inferred in an evolutionary view of history is here defined as ‘evolutionary paleoevil’. Because biological evolution also requires

30. In measuring paleoevil, there is no distinction between naturalistic evolution (with no Creator) and evolutionary creation (where God creates the universe with the ability to evolve itself) or theistic evolution (where God continually creates, but at a more-or-less unobservable micro-scale). If human observers were in place to observe, there would be no observational distinction between and among these three ideas, so they would each generate roughly the same paleoevil.

31. Among long-term relationships between organisms (symbioses), evolution would expect mutualism to be rare, and parasitism and pathology to be very common. Unlike evolution expects, mutualism in the present world seems to be more common than the other types of symbiosis (commensalism and parasitism) combined, and pathological organisms account for only about 1/10 of one percent of all species. The fossil record seems to show a similarly high rate of mutualism and low rate of parasitism and pathology.



an old-age interpretation of history,<sup>32</sup> evolutionary paleoevil embraces *both* baseline paleoevil *and* old-age paleoevil *and* adds at least another order of magnitude more paleoevil of its own.

## Theodicy

### Augustine's Theodicy

Most agree that the theodicy of Augustine (AD 354-430) was the dominant theodicy for most of church history.<sup>33</sup> Based upon autobiographical entries in his *Confessiones*, it was concern about the evil in the world which initially drew the young Augustine into the Manichean heresy. One of his most significant intellectual struggles after his conversion, again according to his *Confessiones*, was how evil was to be understood in a Christian perspective of the world. It is no surprise, then, that one of Augustine's earliest Christian publications was *De Libero Arbitrio Voluntatis*,<sup>34</sup> where Augustine introduces a Christian theodicy.

In Augustine's theodicy,<sup>35</sup> moral evil does not come from an evil coexistent with God, as claimed by dualistic religions and heretical perspectives such as that of the Manicheans.<sup>36</sup> According to Augustine, God is the only entity extant from eternity past, and God is entirely good. Furthermore, evil for Augustine is not an essence,

32. Although old-age earth history is *necessary* for naturalistic evolution, naturalistic evolution is *not* a necessary assumption of old ages. Naturalistic evolution cannot be true without old ages also being true, but old age history could be true without naturalistic evolution being true.

33. For example, Barry L. Whitney, *Theodicy: An Annotated Bibliography on the Problem of Evil 1960-1990* (New York, NY: Garland, 1993), 3.

34. Augustine's baptism was in AD 386, and he supposedly wrote the first volume of *De Libero Arbitrio Voluntatis* in the period AD 387 to AD 389.

35. Based on the author's examination of English translations of *De Libero Arbitrio* [Thomas Williams, trans., *On Free Choice of the Will* (Indianapolis, IN: Hackett, 1993)], *Confessiones* [Edward Bouverie Pusey, trans., *The Confessions; The City of God; On Christian Doctrine by Saint Augustine*, ed. Robert Maynard Hutchins (Chicago, IL: Encyclopaedia Britannica, 1952), 1-125.], *De Natura Boni contra Manichaeos* [Albert H. Newman, trans., *Concerning the Nature of Good, Against the Manichees*, ed. Philip Schaff (Edinburgh: T & T Clark, 1886-1890)], *De Genesi ad litteram* [Edmund Hill, trans., *The Works of Saint Augustine: A Translation for the 21<sup>st</sup> Century, Part I: Books, Volume 13: On Genesis* (New York, NY: New City, 2002), 168-506], *De Civitate Dei contra Paganos* [Marcus Dods, trans., *A Select Library of the Nicene and Post-Nicene Fathers of the Christian Church, Volume 2: St. Augustin's City of God and Christian Doctrine*, ed. Philip Schaff (Edinburgh: T. & T. Clark, 1886)], *Contra Julianum* [Matthew A. Schumacher, trans., *Saint Augustine Against Julian* (New York, NY: Fathers of the Church, 1957)], *Enchiridion* [Albert C. Outler, transl., *Handbook on Faith, Hope, and Love*, accessed August 2007, available at <http://www.ccel.org/ccel/augustine/enchiridion.html>].

36. For Augustine's rejection of the eternal coexistence of evil with God see Augustine, *De Natura Boni contra Manichaeos*, chs. 1, 17, 41-47 and Augustine, *De Civitate Dei contra Paganos*, bk. 11, ch. 22.

but a [de]privation of good,<sup>37</sup> so there is no such thing as an intrinsically evil being.<sup>38</sup> Augustine also rejects the Gnostic claims that evil enters the creation by means of the creating angels. Instead Augustine claims that God, and God alone, is the Creator of all things. Augustine also rejects the Greek notion of the evil nature of matter and concludes that all beings were created intrinsically good,<sup>39</sup> because the (only) Creator is not only good, but he repeatedly pronounced the creation ‘good’ and ‘very good’.<sup>40</sup> It is from this latter fact that Augustine also deduces that at the end of the creation there was no moral evil anywhere among the creations listed in Genesis one.

Because God is good in Augustine’s theodicy, moral evil did not arise from God.<sup>41</sup> Rather, moral evil was the invention of wills with the power of free choice<sup>42</sup>—first the free will of angels, and later the free will of Adam.<sup>43</sup> According to Augustine, God created wills with free choice because there is more good in a creation with wills which freely choose good than there is in a creation without such beings.<sup>44</sup> In fact,

37. Augustine, *Nat. Boni*, chs. 4, 15; Augustine, *Confessiones*, bk. 3, ch. 7; bk. 7, ch. 12; Augustine, *Civ. Dei*, bk. 11, ch. 9; Augustine, *Enchiridion*, chs. 11-12; Augustine, *Contra Julianum*, bk. 1, ch. 8, par. 37; ch. 9, par. 42-45; Thomas Aquinas, *Summa Contra Gentiles*, bk. 2, ch. 41; bk. 3, chs. 6-11, 13-14, 20, 85, and 141; bk. 4, ch. 52; Thomas Aquinas, *Summa Theologica*, tr. 1, q. 4, a. 3; q. 14, a. 10; q. 19, a. 9; q. 48, aa. 1, 3, 5; q. 49 a. 1; q. 49, a. 3 ad 2; tr. 2.1, q. 18 a. 1; q. 18, a. 5 ad 2; q. 18, a. 8 ad 1; q. 21, a. 1; q. 25, a. 2; q. 36, a. 1; q. 42, a. 1; q. 78, a. 1; q. 84, a. 3 ad 2; q. 87, a. 7; tr. 3s, q. 12, a. 3 ad 2.

38. Augustine, *Nat. Boni*, ch. 17; Augustine, *Civ. Dei*, bk. 12, ch. 3; Augustine, *Ench.*, ch. 13; Augustine, *Con. Jul.*, bk. 1, ch. 8, par. 36-37; Aquinas, *Con. Gent.*, bk. 3, ch. 7; Aquinas, *Sum. Theol.*, tr. 1, q. 5, a. 3 ad 2; q. 49, a. 3; q. 103, a. 7 ad 1.

39. Augustine, *Nat. Boni*, chs. 1-2, 15-17, 19, 33; Augustine, *Conf.*, bk. 7, ch. 3, par. 4; ch. 5, par. 7; ch. 12, par. 18; bk. 12, ch. 7, par. 7; Augustine, *Civ. Dei* bk. 11, chs. 21-24; bk. 12, chs. 1 and 5; Augustine, *Ench.*, ch. 12; Augustine, *Con. Jul.*, bk. 1, ch. 8, par. 36-37; ch. 9, par. 42; bk. 3, ch. 24, par. 56; bk. 4, ch. 3, par. 30; ch. 7, par. 37; bk. 5, ch. 7, par. 28; ch. 16, par. 59 & 64; bk. 6, ch. 7, par. 20; Augustine, *Gen. Lit.*, bk. 11, ch. 13, par. 17; Aquinas, *Con. Gent.*, bk. 2, chs. 41, 44-45, and 83; bk. 3, chs. 7 and 107; *Sum. Theol.* tr. 1, q. 6, aa. 3-4; q. 20, a. 2; q. 48, a. 1; q. 49, a. 3; q. 63, a. 5; q. 65, a. 2 ad 1; tr. 2.1, q. 5, aa. 1, 3; q. 8, a. 1; q. 18, a. 1.

40. Augustine, *Conf.*, bk. 10, ch. 34, par. 51; bk. 13, ch. 28, par. 43; bk. 13, ch. 34, par. 49; Augustine, *Civ. Dei* bk. 11, ch. 23; Augustine, *Gen. Lit.* bk. 7, ch. 26, par. 37.

41. Augustine, *Nat. Boni*, ch. 29; Augustine, *Conf.*, bk. 1, ch. 7, par. 11; Augustine, *Civ. Dei* bk. 11, chs. 17, 22; Augustine, *Con. Jul.*, bk. 1, ch. 8, par. 37; bk. 3, ch. 24, par. 55; bk. 4, ch. 7, par. 37; Aquinas, *Con. Gent.*, bk. 3, chs. 71 and 162; Aquinas, *Sum. Theol.*, tr. 1, q. 48, a. 5 ad 4; q. 49, aa. 1-2; q. 63, a. 1; tr. 2.1, q. 42, a. 3; tr. 2.1, q. 79, aa. 1-3; q. 80, aa. 1, 4; q. 83, a. 1 ad 4; tr. 2.2, q. 11, a. 1 ad 3.

42. Augustine, *Lib. Arb.*, ch. 1; Augustine, *Conf.*, bk. 4, ch. 15, par. 26; bk. 7, ch. 3, par. 5; Augustine, *Nat. Boni*, ch. 28; Augustine, *Civ. Dei*, bk. 11, chs. 17 and 22; bk. 12, chs. 6-9; bk. 13, ch. 14; Augustine, *Ench.*, chs. 8 and 28; Augustine, *Con. Jul.*, bk. 1, ch. 5, par. 16; ch. 8, pars. 37-38; ch. 9, par. 42; bk. 3, ch. 5, par. 11; ch. 24, par. 55; bk. 4, ch. 7, par. 35; bk. 5, ch. 4, par. 17; ch. 16, par. 64; bk. 6, ch. 10, par. 28; Aquinas, *Sum. Theol.* tr. 1, q. 19, a. 10 ad 2; q. 48, aa. 5-6; tr. 2.1, q. 74, a. 2; q. 75, aa. 2-3; q. 77, a. 3; q. 78, a. 1; q. 79, a. 2; q. 80, a. 1.

43. Augustine, *Ench.*, ch. 8; Augustine, *Con. Jul.*, bk. 3, ch. 9, par. 18; ch. 26, par. 63; Aquinas, *Con. Gent.*, bk. 4, ch. 50.

44. Augustine, *Lib. Arb.*, ch. 2; Augustine, *Ench.*, ch. 28. Aquinas adds further goods to the creation of free-will beings such as: (a) a greater multitude of actions are generated by free-will beings than non-free-will beings (Aquinas, *Con. Gent.* bk. 3, ch. 73); and (b) free-will beings permit the demonstration of more of God’s attributes in created beings, such as the free will of God Himself (Aquinas, *Con. Gent.*, bk. 2, chs. 46-48; bk. 3, ch. 73).

even as he considered the evil which resulted from those wills which did not choose the highest good, God still considered a creation with free wills a greater good than a creation without such free wills.

The timing of moral evil's origin for Augustine is intimately related to his understanding of creation—the latter being an issue he struggled to clarify for most of his life.<sup>45</sup> Augustine concluded that the six-day creation began with the creation of light in Gen 1:3, took no more than an instant of time for God to accomplish,<sup>46</sup> and occurred no more than 6000 years<sup>47</sup> before his time. Augustine also believed that three things were created by God sometime before the six-day creation, possibly even far back in the distant past (without such things coexisting with God in eternity past<sup>48</sup>): time,<sup>49</sup> the heaven of heavens as the abode of God Himself,<sup>50</sup> and the matter from which everything in the six-day creation was constructed.<sup>51</sup> Although Augustine believed that angels were created with the creation of the light in Gen 1:3,<sup>52</sup> he did allow for the possibility that angels were created as part of the heaven of heavens in

45. Augustine not only makes this claim in *Retractationes*, but this is evidenced by an abandoned attempt at a literal interpretation of creation (*De genesi ad litteram imperfectus liber*) before a completed attempt later in life (*De genesi ad litteram*). Augustine seems to have sought a literal understanding of Genesis in the light of the apparent contradiction between the six days of creation of Genesis One and the instantaneous creation indicated in *Sir.* 18:1 (Augustine, *Gen. Lit.*, bk. 5, ch. 17, par. 35; bk. 6, ch. 3, pars. 4-6; ch. 9, par. 16 through ch. 11, par. 19; ch. 14, par. 25 through ch. 18, par. 29; bk. 7, ch. 28, par. 41), which Augustine thought to be Scriptural canon.

46. Augustine, *Gen. Lit.*, bk. 1, ch. 15, par. 29; ch. 17, par. 32; bk. 4, ch. 33, par. 51 through ch. 35, par. 56; bk. 5, ch. 1, par. 1 through ch. 4, par. 6; ch. 5, pars. 12 and 15; ch. 11, par. 27; ch. 17, par. 35; ch. 23, pars. 45-46; bk. 6, ch. 1, par. 1 through ch. 3, par. 4; bk. 7, ch. 24, par. 35; ch. 28, par. 42; Aquinas seems to have accepted Augustine's thoughts on this (Aquinas, *Sum. Theol.*, tr. 1, q. 74, a. 2; tr. 3, q. 9, a. 3; tr. 3s, q. 77, a. 4 ad 1).

47. Augustine, *Civ. Dei*, bk. 12, chs. 10-12. These calculations are based upon a LXX chronology. In his discussion of the numbers of Genesis 5 and 11, however, Augustine expresses uncertainty that the LXX numbers are the correct ones (Augustine, *Civ. Dei*, bk. 15, ch. 13). Augustine may have considered the shorter Hebrew-based chronology a possibility as well.

48. Augustine, *Conf.*, bk. 12, ch. 2, par. 2 through ch. 12, par. 15; ch. 15, pars. 18 and 20; bk. 12, ch. 29, par. 40; Augustine, *Gen. Lit.*, bk. 1, ch. 1, pars. 2-3; ch. 9, par. 15; bk. 4, ch. 21, par. 38). Notably, in the later *Gen. Lit.* (Augustine, *Gen. Lit.*, bk. 1, ch. 16, par. 29; ch. 17, par. 32) Augustine does not seem to permit this initial creation to precede the six-day creation as he places the creation of Genesis 1:1 within the same instant as the six-day creation.

49. Augustine, *Conf.*, bk. 11, ch. 10, par. 12 through ch. 14, par. 17; bk. 11, ch. 30, par. 40; Augustine, *Civ. Dei*, bk. 11, chs. 5-6; bk. 12, ch. 15; Augustine, *Gen. Lit.*, bk. 1, ch. 1, par. 2; ch. 9, pars. 15-16; bk. 5, ch. 5, par. 12.

50. Augustine, *Conf.*, bk. 12, ch. 9, par. 9; ch. 11, par. 13; ch. 15, par. 18; Augustine, *Gen. Lit.*, bk. 1, ch. 1, pars. 2-3; ch. 9, par. 15; ch. 17, par. 32; bk. 4, ch. 21, par. 38.

51. Augustine, *Conf.*, bk. 12, ch. 2, par. 2 through ch. 3, par. 3; ch. 8, par. 8; Augustine, *Gen. Lit.*, bk. 1, ch. 1, par. 2; ch. 9, pars. 15-16; bk. 2, ch. 11, par. 24; bk. 4, ch. 21, par. 38; bk. 5, ch. 5, par. 12.

52. Augustine, *Conf.*, bk. 13, ch. 2, par. 3 through ch. 4, par. 5; ch. 8, par. 9; Augustine, *Civ. Dei*, bk. 11, chs. 7, 9, 19; bk. 12, ch. 15; Augustine, *Gen. Lit.*, bk. 2, ch. 8, pars. 16-19.

Gen 1:1<sup>53</sup> or even possibly as part of a creation event ‘preceding’ the creation of time and our universe.<sup>54</sup>

Augustine’s position on when the angels fell is not as clearly presented, but it can be deduced fairly precisely. First, Augustine believed that angels were good at their creation.<sup>55</sup> Second, Augustine does not believe they existed before God said ‘Let there be light’ (Gen 1:3)<sup>56</sup> nor even ‘before’ God pronounced the creation ‘very good’ (Gen 1:31).<sup>57</sup> Finally, Augustine seems to lean in the direction of a fall of the angels virtually instantaneously after their creation.<sup>58</sup> All this means that the angels were created in the same instant as the remainder of the six-day creation (including the same instant as man was created) and that they fell very quickly thereafter. Thus, Augustine placed the first sin of angels *after* the creation of man.

### **Augustine and Natural Evil**

Most of Augustine’s natural evil discussion concerns the impact of natural evil on humans. Augustine’s thoughts on natural evil itself or natural evil’s impact on animals are very uncommon, and consequently difficult to infer. First of all, Augustine seems to consider some natural evils inherent to even a ‘good’ creation. These include, at the very least, protective pain (non-excessive pain which warns an animal to avoid sustained harm),<sup>59</sup> evils of inequality (where different beings have different

53. Augustine, *Civ. Dei*, bk. 12, ch. 15.

54. Augustine, *Civ. Dei*, bk. 11, ch. 32; bk. 12, chs. 15-16.

55. Augustine, *Civ. Dei*, bk. 11, chs. 11, 13-15, 17; bk. 22, ch. 1; Augustine, *Con. Jul.*, bk. 5, ch. 16, par. 59; Augustine, *Gen. Lit.*, bk. 11, ch. 21, par. 28; ch. 23, par. 30. Ezekial 28, for example, indicates that Satan was originally unfallen: Augustine, *Civ. Dei*, bk. 11, ch. 15; Aquinas, *Sum. Theol.*, tr. 1, q. 62, a. 3; q. 95, a. 1; q. 63, a. 6 ad 4; tr. 2.2, q. 5, a. 1.

56. Augustine, *Gen. Lit.*, bk. 1, ch. 17, pa. 33.

57. Augustine, *Civ. Dei*, bk. 11, ch. 9; Augustine, *Gen. Lit.*, bk. 11, ch. 21, par. 28; ch. 23, par. 30. It must be noted that in Augustine’s earlier work (Augustine, *Civ. Dei*, bk. 11, ch. 32; bk. 12, chs. 15-16) does cautiously allow for the possibility of the angels having been created *before* Genesis 1:1, so it would not be possible for the angels to have fallen before Genesis 1:1. By the time he wrote *Gen. Lit.* it appears that he no longer entertained that possibility. Even if he did, however, since Augustine’s creation was instantaneous, already fallen angels could not cause natural evil in this creation before the creation of humans. Aquinas, *Con. Gent.*, bk. 2, chs. 44-45 and 83; bk. 3, ch. 107; Aquinas, *Sum. Theol.*, tr. 1, q. 63, a. 5.

58. Augustine, *Gen. Lit.*, bk. 11, ch. 16, par. 21 through ch. 25, par. 33. Aquinas (*Sum. Theol.*, tr. 1, q. 63, a. 6) is explicit about the fallen angels being created good and being good for one moment and falling the second moment.

59. As Augustine argues (*Gen. Lit.*, bk. 3, ch. 16, par. 25) and Aquinas agrees (*Sum. Theol.*, tr. 2, q. 15, a.5 ad 2) that at least *some* pain is good.

capabilities),<sup>60</sup> animal death,<sup>61</sup> evils of population replacement (where, to preserve species, physical organisms must be generated and grow at the expense of other beings in order to replace individuals who die),<sup>62</sup> and evils of trophic consumption (where lesser organisms are consumed for the sake of higher organisms).<sup>63</sup> It seems reasonable to infer<sup>64</sup> that Augustine understood that all four of these evils (non-excessive pain, inequality of ability, animal death, carnivory) existed as part of—or potentially part of<sup>65</sup>—the ‘very good’ creation preceding Adam’s fall.

Augustine does allow for the possibility that thorns and thistles might have predated Adam’s sin,<sup>66</sup> as the thorns might have had another function before man’s fall and took on a punitive function of invading human fields only after Adam’s sin. Like many others in his day, Augustine believes that in the present world lower organisms arise by spontaneous generation, some from non-living things, some from decaying plant matter, and still others from decaying animal matter.<sup>67</sup> Interestingly enough, Augustine does *not* believe that animals that arise from decaying animal matter were part of the original creation.<sup>68</sup> So, although he seems to accept (the potentiality of) animal death before the fall of Adam, he does not believe that God, in the instant

60. Augustine, *Nat. Boni*, chs. 13-16, 30; Augustine, *Civ. Dei*, bk. 11, chs. 6, 22; bk. 12, ch. 4; Aquinas, *Con. Gent.* bk. 2, chs. 44-45 and 95; bk. 3, chs. 71-72, 74, 94, 97, and 109; Aquinas, *Sum. Theol.*, tr. 1, q. 22, a. 4; q. 23, a. 5 ad 1, 3; q. 47, aa. 1-2; q. 48, a. 2; q. 65, a.2 ad 3; q. 72; q. 75, a. 7; q. 92, a. 1 ad 3; q. 96, aa. 1-3; tr. 2.1, q. 79, a. 4 ad 1.

61. Augustine, *Civ. Dei*, bk. 12, ch. 4; Augustine, *Gen. Lit.*, bk. 3, ch. 16, par. 25; Aquinas, *Con. Gent.*, bk. 3, chs. 22, 69, 112, 126-127, 129, and 140; Aquinas, *Sum. Theol.*, tr. 1, q. 22, a. 2 ad 2; q. 23, a. 7; q. 48, a. 2 ad 3; q. 96, a. 1; tr. 2.2, q. 64, a. 1; q. 66, a. 1.

62. Augustine, *Civ. Dei*, bk. 12, ch. 4; Augustine, *Gen. Lit.*, bk. 3, ch. 16, par. 25; Aquinas, *Con. Gent.*, bk. 3, chs. 69 and 126; Aquinas, *Sum. Theol.*, tr. 1, q. 23, a. 7.

63. Augustine, *Civ. Dei*, bk. 12, ch. 4; Augustine, *Gen. Lit.*, bk. 3, ch. 16, par. 25; Aquinas, *Con. Gent.*, bk. 3, chs. 22, 71, 112, 127, 129, and 140; Aquinas, *Sum. Theol.*, tr. 1, q. 22, a. 2 ad 2; q. 48, a. 2 ad 3; q. 96, a. 1; tr. 2.2, q. 64, a. 1; q. 66, a. 1.

64. A direct claim of this nature has not yet been located in Augustine’s works. In contrast, Thomas Aquinas, otherwise very closely following Augustine, *does* explicitly assign carnivory (Aquinas, *Con. Gent.*, bk. 3, ch. 127; Aquinas, *Sum. Theol.*, tr. 1, q. 96, a. 1), death (Aquinas, *Sum. Theol.*, tr. 1, q. 72, a. 5; tr. 3s, q. 91, a. 5), and natural antipathy (Aquinas, *Sum. Theol.*, tr. 1, q. 96, a. 1) to the animal world before the fall of Adam. He also claims thorns and thistles predated man’s fall—it is just they did not negatively impact man’s agriculture (Aquinas, *Sum. Theol.*, tr. 1, q. 69, a. 2 ad 2; tr. 3s, q. 91, a. 3 ad 3).

65. Seeing as he doesn’t explicitly state this claim, it may be that Augustine believes in the *potential* of these things before the sin of Adam, but that the brief period of time between creation and fall was too short to actualize this potential. In other words animal death didn’t actually occur before the sin of Adam, but, in principle *could* have occurred if a long enough period of time elapsed between the creation and man’s Fall for it to actually occur.

66. Augustine, *Gen. Lit.*, bk. 3, ch. 18, par. 28.

67. Given that the early development of *all* organisms is microscopic, and microscopes were not invented until the seventeenth century, it was common in the ancient world to believe that living things—‘lower’ organisms, anyway—could be generated spontaneously from non-living matter. It was most common—and apparently the case for Augustine—to believe that lower animals arise from non-living materials.

68. Augustine, *Gen. Lit.*, bk. 3, ch. 14, par. 23.

of the creation, created dead things or organisms that arise *from* dead things. We would infer from this that Augustine would have rejected the notion that God directly created animal fossils, as fossils would constitute direct evidence of death.

These five (non-excessive pain, inequality of ability, animal death, carnivory, thorns/thistles) seem to be the only examples of natural evil that Augustine grants *might* have existed in the pre-Fall world.<sup>69</sup> The only other explanation Augustine offers for natural evil is as God's punishment of Adam's 'original sin'.<sup>70</sup> Natural evils that Augustine explicitly identifies as examples of God's punishment of original sin include: disease in animals,<sup>71</sup> frost,<sup>72</sup> wildfire,<sup>73</sup> wear and tear of the general creation,<sup>74</sup> and disease and genetic deformities in innocent children.<sup>75</sup> Augustine does not believe these natural evils could have existed before Adam's sin.<sup>76</sup> Among the punishments of Adam's original sin, Augustine also included natural evils which result in human fear,<sup>77</sup> thirst and hunger,<sup>78</sup> excessive pain,<sup>79</sup> and toil<sup>80</sup> in humans guilty of voluntary sin (e.g., earthquakes; poisoned air, water, and soil; extreme storms, lightning, hail,

69. These five evils are directly or indirectly inferred from Augustine's writings to be evils *and* preceding or potentially preceding man's sin. However, there are instances where Augustine claims that *all* evil and suffering is punishment of sin (Augustine, *Lib. Arb.*, bk. 1; Augustine, *Conf.*, bk. 7, ch. 3, par. 5; Augustine, *Civ. Dei*, bk. 13, ch. 14). Perhaps the short time between creation and fall prevented any of these *potential* evils from occurring, so although natural evil *in principle* might have pre-existed the Fall, *in practice*, it did not.

70. For example, all 'cruel ills': Augustine, *Civ. Dei*, bk. 22, ch. 22. So far as the author can tell, Augustine does not even identify any natural evils with angels, although he does suggest *angelic* sin can be used by God as punishment for Adam's original sin.

71. Augustine, *Ench.*, ch. 11.

72. Augustine, *Civ. Dei*, bk. 11, ch. 22.

73. Augustine, *Civ. Dei*, bk. 11, ch. 22.

74. Augustine, *Gen. Lit.*, bk. 11, ch. 35, par. 48.

75. Augustine, *Con. Jul.*, bk. 3, ch. 4, par. 10; ch. 6, par. 13; bk. 6, ch. 10, par. 30; Aquinas, *Sum. Theol.*, tr. 2.1, q. 87, a. 7 ad 1; tr. 3s, q. 32, a. 4.

76. Aquinas explicitly includes the general deterioration ('advanced age') of the world (Aquinas, *Sum. Theol.*, tr. 3s, q. 74, a. 2 ad 2), excessive pain in animals (as implied in Aquinas, *Sum. Theol.*, tr. 2.1, q. 39, a. 2), birth deformities in animals (Aquinas *Con. Gent.* bk. 3, ch. 6; Aquinas, *Sum. Theol.*, tr. 2.1, q. 21, a. 1 ad 1), and the blindness of the man in John 9:2-3 who did nothing to deserve the affliction (Aquinas, *Sum. Theol.*, 2.1, q. 87, a. 7 ad 1)

77. Augustine, *Civ. Dei*, bk. 22, ch. 22.

78. Augustine, *Civ. Dei*, bk. 22, ch. 22; Aquinas, *Con. Gent.*, bk. 4, ch. 52; Aquinas, *Sum. Theol.*, tr. 3, q. 1, a. 4 ad 2; q. 14, aa. 1, 4; q. 69, a. 3 ad 2.

79. Augustine, *Civ. Dei*, bk. 14, ch. 10; bk. 22, ch. 22; Augustine, *Con. Jul.*, bk. 4, ch. 16, par. 83; Augustine, *Gen. Lit.*, bk. 11, ch. 35, par. 48; Aquinas, *Sum. Theol.* tr. 2.1, q. 39, a. 2 ad 1; a. 3 ad 1; tr. 3, q. 15, a. 5 ad 2.

80. Augustine, *Civ. Dei*, bk. 14, ch. 10; bk. 22, ch. 22; Augustine, *Con. Jul.*, bk. 4, ch. 16, par. 83; Augustine, *Gen. Lit.*, bk. 8, ch. 8, par. 15 through ch. 9, pa. 18; ch. 10, pa. 22; bk. 11, ch. 35, pa. 48; ch. 38, pa. 51.



wind, and floods; diseases; accidental injury; plant and animal toxins;<sup>81</sup> hurtful animals;<sup>82</sup> and degenerative aging<sup>83</sup>). Augustine seems to have understood any natural evil which was unnecessary for the maintenance of the creation was an imposition on the original creation, i.e., divine punishment for Adam's original sin. This would have probably included most natural evils, including all astronomical, geological, and climatological natural evils and most biological natural evils (minus, apparently, plant and animal toxins, carnivory, and organismal death).

Augustine not only collected fossils,<sup>84</sup> he also understood them to be evidence of life that existed in the past. Although he undoubtedly did not understand the full magnitude of paleoevil, Augustine was not completely ignorant of paleoevil. What he knew of it he assigned to a time following the sin of Adam.<sup>85</sup> Augustine would reject old-age paleoevil because old ages are incompatible with Augustine's time line of earth history. Augustine would reject evolutionary paleoevil, both because of the rejection of old-age history required with evolution, and also because of Augustine's belief in the inherent goodness of the matter of creation.<sup>86</sup>

## Theodicy through the Reformation

For more than a millennium following Augustine, the church seems to have embraced both the cosmogony and theodicy of Augustine. Over eight centuries later, for ex-

81. Although Augustine considers both harmful animals and animal and plant toxins to be punishment for sin (Augustine, *Civ. Dei*, bk. 22, ch. 22; Augustine, *Gen. Lit.*, bk. 3, ch. 17, par. 26; bk. 8, ch. 10, par. 21), he does acknowledge in Augustine, *Civ. Dei*, bk. 11, ch. 22 that such things do not always have to be evil. In fact, in Augustine, *Gen. Lit.*, bk. 3, ch. 15, par. 24 he acknowledges that it is possible that 'harmful' animals and plant and animal 'toxins' may have existed in the original creation while God somehow prevented them from doing harm (as in the case of preventing lions from harming Daniel and a poisonous snake from harming Paul).

82. Augustine, *Civ. Dei*, bk. 22, ch. 22. Also Augustine, *Conf.*, bk. 5, ch. 9, par. 16 & Augustine, *Con. Jul.*, bk. 5, ch. 7, par. 28 & Augustine, *Gen. Lit.*, bk. 11, ch. 31, par. 42 for disease. Also Augustine, *Civ. Dei*, bk. 11, ch. 22 for hurtful animals. Aquinas's list includes infertile soil (Aquinas, *Sum. Theol.*, tr. 2.2, q. 164, a. 2), weeds (Aquinas, *Sum. Theol.*, tr. 2.2, q. 164, a. 2; tr. 3s, q. 91, a. 3 ad 3), and inefficiency in body functions which require consumption of excess food (Aquinas, *Sum. Theol.*, 3s, q. 81, a. 4).

83. Augustine, *Gen. Lit.*, bk. 11, ch. 31, par. 42.

84. In *Civ. Dei* bk. 15, ch. 9 Augustine reported finding giant human molars, which were most probably mastodon molars.

85. According to our best understanding of Augustine's view on natural evil, and given the evidence of astronomical, geological, and climatological natural evils in the fossil record, he would likely have assigned the entire fossil record of animals to a period following the sin of Adam.

86. In Augustine's theodicy, the original creation was inherently good (Augustine, *Nat. Boni*, chs. 1-2, 15-17, 19, 33; Augustine, *Conf.*, bk. 7, ch. 3, par. 4; ch. 5, par. 7; ch. 12, par. 18; bk. 12, ch. 7, par. 7; Augustine, *Civ. Dei*, bk. 11, chs. 21-24; bk. 12, chs. 1, 5; Augustine, *Ench.*, ch. 12; Augustine, *Con. Jul.*, bk. 1, ch. 8, pars. 36-37; ch. 9, par. 42; bk. 3, ch. 24, par. 56; bk. 4, ch. 3, par. 30; ch. 7, par. 37; bk. 5, ch. 7, par. 28; ch. 16, pars. 59 & 64; bk. 6, ch. 7, par. 20). Evolution requires a type of inherent evil in the original creation (for example, its 'struggle for survival') which Augustine would likely find unacceptable.

ample, Thomas Aquinas<sup>87</sup> (1225-1274), seems not only to adopt the totality of Augustine's cosmogony and theodicy but even to quote Augustine as an authority on such matters.<sup>88</sup> Whatever paleoevil was recognized would be understood to be divine punishment of Adam's original sin, and there would be room for neither old-age paleoevil nor evolutionary paleoevil.

Since most Reformation traditions rejected both the canonicity of the Apocrypha and the Ancient Greek concept of time,<sup>89</sup> early Reformers did not feel compelled, as Augustine did, to force the six days of creation into an instant of time. This is probably why early Reformers readily accepted a creation of six earth rotation days in length. This, in turn, results in created things being at most only five days older than was believed by those who accepted Augustine's instantaneous creation. In all other ways, the Reformers seem to have embraced an Augustinian theodicy.

### **Post-Reformation Theodicy**

Beginning in the middle of the eighteenth century, old ages began to be inferred from the geological record. As the age of the geologic record was increased, the biblical account was successively re-interpreted to accommodate the time, almost always by inserting increasing amounts of time into the creation account of Genesis one. And, as even greater ages were eventually assigned to astronomical bodies, Genesis 1:14-19 was re-interpreted to accommodate the origin of heavenly bodies before the creation of the earth.

As the age of the rocks was increased, less and less of the geologic record was assigned to Noah's flood.<sup>90</sup> By the second decade of the nineteenth century, Noah's flood was used to explain only the 'diluvium'—at most dozens of feet of gravel and boulder beds near the very top of the geologic column. Twenty years later, the diluvium had been re-interpreted as residue from the 'Ice Age', and the globality of Noah's Flood was rejected by virtually every geologist. In response, a variety of re-interpretations arose for Genesis 6-9 in order to accommodate a local flood.

Very quickly following the publication of Darwin's theory of evolution in 1859 a suite of re-interpretations of the biblical account arose in order to accommodate evolution. Soon after 1860, geologists began extending the length of *human* history. This led to re-interpretations of the Adamic account to accommodate 'ape-human'

87. Based, thus far in my research, upon Aquinas' *Summa Contra Gentiles* and *Summa Theologica*.

88. See the various footnotes earlier in this article to Augustine's theodicy, where citations of Aquinas' same claims are also included.

89. The Ancient Greeks defined time as 'change'. Augustine believed this prevented an unchanging God from operating 'in' time and thus creating over time (e.g., over six days).

90. For histories of this transition see Nicolaas A. Rupke, *The Great Chain of History: William Buckland and the English School of Geology, 1814-1849* (New York: Oxford University Press, 1983) and Charles Coulston Gillispie and Nicolaas Rupke, *Genesis and Geology: A Study of the Relations of Scientific Thought, Natural Theology, and Social Opinion in Great Britain, 1790-1850* (Cambridge, MA: Harvard University Press, 1996).

fossils, arguments for fluidity in the genealogies of Genesis 5 and 11 to accommodate tens and hundreds of thousands of years of human history,<sup>91</sup> and various re-interpretations of Babel to allow for prolonged origin of human language diversity.<sup>92</sup>

As secular geologists gathered evidence of an older and older earth, a majority of the educated believers accepted the earth's antiquity. As they did, they implicitly—and undoubtedly in most cases unwittingly—accepted an exponentially increasing amount of old-age paleoevil. Paradoxically, even though Augustine's free-will theodicy cannot accommodate either old-age or evolutionary paleoevil, his theodicy continued to be the dominant theodicy among believers until at least the middle of the twentieth century.<sup>93</sup>

## More Recent Theodicies

Some believe that Christian theodicy was saved from the attacks of atheologists in the second half of the twentieth century by Alvin Plantinga's free-will defense.<sup>94</sup> To explain natural evil—and implicitly old-age paleoevil—Plantinga suggests that the possibility that angels fell in the distant past, combined with the possibility that fallen angels can directly cause natural evil, makes an explanation for natural evil possible in a Christian perspective of the world.<sup>95</sup> Plantinga claims that both of these possibilities were believed by the Church Fathers and by Augustine in particular.<sup>96</sup> As clarified above, Augustine believed neither of these claims. Furthermore, as Augustine pointed out, a straightforward understanding of Ezekiel 28 would suggest that Satan was still unfallen in the Garden of Eden. Yet the Garden of Eden was not created until Day 6 of

91. And, ultimately, at least two million years of human history.

92. The reinterpretation of Genesis brought about by an old-age interpretation of earth history led Barry Whitney, in his bibliography of theodicy, to claim (Whitney, *Theodicy*, 16) that "...the vast majority of philosophers and theologians who fill the annotated chapters of this bibliography do not base rational theodicy upon the Adamic myth."

93. Similarly, a certain percentage of educated believers have accepted natural selection-driven evolution as the mechanism by which God created organisms. As this view of biology has been embraced, not only does old-age paleoevil have be accepted, but evolutionary paleoevil has to be accepted as well.

94. Barry Whitney, in his bibliography of theodicy (Whitney, *Theodicy*, 17) admits that Plantinga's works were seminal for the generation of theodicies based upon an old-age perspective of earth history.

95. Alvin Plantinga, "The free will defence[sic]" in *Philosophy in America*, ed. Max Black (Ithaca, NY: Cornell University Press, 1965), 204-20; Alvin Plantinga, "The Free Will Defense" in *God and Other Minds: A Study of the Rational Justification of Belief in God* (Ithaca, NY: Cornell University Press, 1967), 149-51; Alvin Plantinga, "God, Evil, and the Metaphysics of Freedom" in *The Nature of Necessity* (Oxford: Oxford University Press, 1974), 164-95; Reprinted in *The Problem of Evil*, ed. Marilyn McCord Adams and Robert Marrihew Adams (New York: Oxford University Press, 1990), 82-109; Alvin Plantinga, "The Problem of Evil" in *God, Freedom, and Evil* (Grand Rapids, MI: William B. Eerdmans, 1974), 7-64; Alvin Plantinga, "Reply to the Basingers on Divine Omnipotence," *Process Studies* 11, no. 1 (1981): 25-29.

96. Plantinga, "God, Evil, and the Metaphysics of Freedom," 191; Plantinga, "The Problem of Evil," 58.

the Creation Week (Gen 2:6). As we inferred Augustine to have believed, this would suggest that angels did not fall before the creation of man, so fallen angels cannot be used to explain old-age paleoevil. Plantinga's free-will defense does not aid in the development of a biblically-based theodicy for old-age paleoevil. In the light of an old earth, Plantinga's theodicy and all theodicies based upon it, appear to be vulnerable to the atheologian's challenge of the existence of pre-human natural evil.

Plantinga's trans-world depravity defense also seems inadequate for the development of a biblical theodicy. In his trans-world argument,<sup>97</sup> Plantinga suggests that it may not have been within the power of God to create a world where a free-will being will *always* choose good. In other words, Plantinga suggests that *all* free-will beings suffer from 'trans-world depravity'—that is to say that all free-will beings would have chosen evil at least once in every possible created world. This means at least *some* moral evil *must* exist in every possible created world (thus, Plantinga concludes that this world, out of all the possible created worlds, is the one which possesses the minimum amount of evil for its contained good). Yet, unlike as Plantinga suggests, unfallen angels—rational beings who always have chosen good and presumably will always choose good—seem to be examples of beings not subject to trans-world depravity. Therefore, God could have created a universe where the only rational beings were the unfallen angels. Plantinga's argument might be saved by suggesting that perhaps all human-like rational beings suffer from trans-world depravity, but another problem exists for Plantinga's theodicy. Plantinga believes in old-age paleoevil, and even the possibility of theistic evolution—thus also evolutionary paleoevil. This kind of a creation contains many orders of magnitude more natural evil than that believed by the Church for most of its history—namely a recent creation originally lacking natural evil. Given that God *could* have created the world without evolutionary and old-age paleoevil (as those who accept a young age of the earth believe), it seems it would be very difficult to argue that God could not have created a world with less evil than an old creation would contain. Once again, Plantinga's defense is not helpful to the development of a biblical theodicy to explain old-age and evolutionary paleoevil.

More recently, William Dembski<sup>98</sup> offered a distinct theodicy for natural evil. Like Augustine's theodicy Dembski posits that natural evil is a consequence of human sin, but unlike Augustine, he suggests that God introduced natural evil into the creation pre-emptively. God introduced natural evil into the world, knowing that man would (eventually) fall, and desiring that when man was expelled from the Garden of Eden, man would feel the full brunt of the effects of his sin immediately (and thus

97. Alvin Plantinga, "Which Worlds could God have Created?" *The Journal of Philosophy* 70, no. 17 (1973): 539-52; Plantinga, "God, Evil, and the Metaphysics of Freedom," 184-89; Plantinga, "The Problem of Evil," 45-53.

98. William A. Dembski, "Christian Theodicy in the Light of Genesis and Modern Science," 2006, accessed March 20, 2017, available at [https://billdembski.com/documents/zz2006.04.christian\\_theodicy.pdf](https://billdembski.com/documents/zz2006.04.christian_theodicy.pdf).

understanding the full depth of the evil of his sin). Dembski offers biblical examples of God's pre-emptive action, but they are all examples of pre-emptive grace. Since grace is unmerited, it is not unreasonable for God to grant us grace before we respond favorably to it. On the other hand, punishment of a man, or of a man's dominion, prior to that man's sin seems on the face of it to be neither reasonable nor evidenced in Scripture. And, even if God intended natural evil to be fully realized by the time Adam was displaced from the Garden, it is not clear that he should have required any time to make it happen, or if so, that it had to be introduced very much before the expulsion of Adam and Eve. One half billion years of old-age paleoevil before the expulsion of Adam and Eve from the Garden of Eden seems completely unjustified.

## Conclusion

A young-age interpretation of earth history dominated Jewish and Christian thought until the nineteenth century.<sup>99</sup> For the latter part of this period and most of Church History, the dominant explanation for the existence of moral evil was the theodicy of Augustine. Augustine's theodicy also provides explanation for present natural evil and both baseline and young-age paleoevil. However, given its dependence on an instantaneous creation in Genesis one, Augustine's theodicy is not consistent with an old earth interpretation. Furthermore, an old earth interpretation of earth history requires paleoevil which Augustine's theodicy cannot in principle explain—or be made to explain. This leaves Augustine's theodicy thoroughly unable to address the additional problem of the sheer magnitude of old-age paleoevil (let alone the even-greater magnitude of evolutionary paleoevil). A theodicy of a radically different form than that proposed by Augustine is necessary to explain old-age paleoevil—or the evolutionary paleoevil which is a further amplification of it.

If Christians are to accept an old-age or evolutionary interpretation of earth history, a theodicy is needed that provides explanation for old-age or evolutionary paleoevil. Theodicies which focus only on moral evil or *human* suffering due to natural evil<sup>100</sup> are inadequate because they fail to address the issue of paleoevil at all. Theodicies like that of Augustine are inadequate because they are able to address only the paleoevil following the Fall of humans. Such theodicies come nowhere close to explaining more than five orders of magnitude more natural evil that is assumed in an old-age interpretation of earth history—all *before* the Fall of man. Theodicies that suggest natural evil arose from some sort of angelic source—like the theodicy of Plantinga—are not consistent with biblical angelology. Theodicies that suggest natural evil was introduced by God before human sin are not consistent with biblical theology. It seems we are forced to conclude that God himself is directly

99. This is simply because this is consistent with the most natural reading of the biblical account.

100. E.g., Diogenes Allen, *The Traces of God in a Frequently Hostile World* (Cambridge: Cowley, 1981).

responsible for the paleoevil dating before the Fall of humanity, something which seems inconsistent with him being all good.

All the suggested theodicies fail even more in explaining evolutionary paleoevil. In fact, the natural evil assumed in evolutionary theory is so deeply imbedded in the nature of world—at least the biological world—that there is a sense in which natural biological processes would be intrinsically evil. So deeply imbedded is natural evil in an evolutionary perspective that there seems to be difficulty in accepting Jesus's incarnation (i.e., it seems impossible that an infinitely good God could take on matter which is operating under such an evil set of principles).

In short, an Augustinian theodicy—or something similar to it—provides adequate explanation for natural evil in a young-age view of earth history. However, a reasonable theodicy for old-age paleoevil and evolutionary paleoevil does not seem to exist, making old-age and evolutionary theories of earth history extremely vulnerable to atheological criticisms.



## ***The Final Word: Prisoners of Our Own Device***

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**Abstract:** Over-confidence in a set of beliefs is frequently buttressed by a binary mentality and, strangely for Christians, a microscopic view of God. Such misplaced assurance can quickly lead to a fixed outlook that assumes an aura of irrefutable permanence. That humans gravitate toward rigid ways of thinking is unremarkable, but it is especially surprising how many educated individuals seem trapped in a perpetually decaying orbit about their pet theories and theologies. For scientists, theologians, and philosophers purportedly engaged in a search for truth, this is a particularly troubling state of affairs and is the root of much unnecessary conflict at the interface of the disciplines.

**Key Words:** binary fallacy, size of God, interdisciplinarity, freedom, constraint, philosophy of science, Christianity

### **Intimations of Finality**

Pulling off the highway beside the rural Cimarron Cemetery between Gunnison and Montrose, Colorado, I was amused to note adjacent to the small entrance arch a black and yellow road sign proclaiming, “No Outlet.” “Well, yeah,” I thought to myself, and wondered if the humor was intentional or the sentiment correct.

Unfortunately, although the apparent decisiveness of death is obvious, intimations of finality all too often also characterize the assertions of scientists, theologians, and philosophers: the prevailing assumption in these cases being that one has the final word on some matter of importance. As a result, individuals who should know better frequently end up erecting a fortress from which they are prepared, henceforth and forevermore, to defend their position to the death.<sup>2</sup> The form a “final word” takes can be quite varied, perhaps supporting one side or the other of a specific argument, proclaiming that science or theology or philosophy can provide no solution to a certain problem, or believing that reconciliation between competing views is impossible. Sometimes the only person actually affected is the one pronouncing the “final word,”

1. The author wishes to thank two anonymous reviewers and the editor for their helpful comments and suggestions.

2. Josh Reeves and Steve Donaldson, *A Little Book for New Scientists: Why and How to Study Science* (Downers Grove, IL: IVP Academic, 2016), 84.

who by his or her assumption of ultimate authority simply undermines any possibility for growth in personal insight. More often, however, such a position constructs a barrier that gives the impression to others of opinion having been elevated to truth—a position which, ironically, effectively inhibits transmission of the desired message.<sup>3</sup> The overall effect is therefore exactly opposite from that intended, for although some may be bullied into submission by these tactics, most thinking individuals will merely walk away.<sup>4</sup>

Now one would think that scientists and theologians, in particular, would be more forward-looking in their views.<sup>5</sup> If we have learned anything from our obsession with modernity, it is that there is no such thing, for “Thoroughly Modern Millie” rapidly becomes “Formerly Modern Millie.” Yet despite that awareness, it is typical to discover both scientists and theologians acting as if they (or at least people they admire) have the final word. Thus we find physicists David Lindley and Russell Stannard announcing, respectively, *The End of Physics* and *The End of Knowledge*, while science writer John Horgan asserts *The End of Science*.<sup>6</sup> These declarations sound somewhat reminiscent of Nietzsche’s claims about the end of God,<sup>7</sup> but dormant theologies can also originate from more reverent perspectives. Thus it is not unusual to observe comparable proclamations which discount Jesus’ remark that “I have much more to say to you, more than you can now bear.”<sup>8</sup>

### **Putting Philosophy of Science in Its Place**

Jesus also promised his disciples: “You will know the truth, and the truth will set you free,”<sup>9</sup> and it is relatively easy to see how a focus on this to the exclusion of anything else (i.e., his remark above) could lead to a tendency to think one has the final word. Yet there is a subtle but important difference in knowing the truth and in knowing that what we know is the truth. One might “know” several things about theology (or

3. Ibid., 115-16.

4. As Philip Clayton notes, “The wise man is the one who knows which opinions can be altered by the force of the better argument, which opinions should be altered but will not be, and which opinions go beyond matters of argumentation altogether” (Jean Staune, ed., *Science and the Search for Meaning: Perspectives from International Scientists* [West Conshohocken, PA: Templeton, 2006], x).

5. Reeves and Donaldson, op. cit., 81-84.

6. David Lindley, *The End of Physics: The Myth of a Unified Theory* (New York: Basic, 1994); Russell Stannard, *The End of Discovery: Are We Approaching the Boundaries of the Knowable?* (New York: Oxford University Press, 2010); John Horgan, *The End of Science: Facing the Limits of Knowledge in the Twilight of the Scientific Age* (Reading, MA: Addison-Wesley, 1996).

7. Friedrich Nietzsche, *Thus Spoke Zarathustra: A Book for All and None*, trans. Thomas Common (Blacksburg, VA: Thrifty, 2009), 20.

8. John 16:12. While some individuals merely appear to ignore this claim, others act as though Jesus was somehow subsequently able to transfer the entire divine intellect into a subset of his original and future disciples.

9. John 8:32.

biology), for instance, but that is not the same as knowing which of those things are actually true. Ultimately we can only have some level of confidence that something is or is not the case, and the measure of that confidence is our faith, be it scientific or religious.<sup>10</sup> That is, we may actually have knowledge about something, but knowing if it is genuine is always problematic. Of course the issue of how we (think we) “know” things is at the heart of philosophy (but also psychology, neuroscience, and so on).

In any event, this approximate nature of knowledge need not lead to a paralyzing skepticism. What the early disciples “knew” to be the case about Jesus and what people have “known” to be the case about the universe are both examples of roller coaster rides through changing beliefs but, in both cases, with a general trend toward better understanding. In each of these situations it seems unlikely that any particular state of “knowledge” is the final word, but it also appears that any particular state of “knowledge” is typically superior to its predecessors (whether it be in terms of better predictions or better relationships).

The proclamations of modernity have been and always will be moving targets. Ideally we would hope to find ourselves moving closer and closer toward the truth about the universe and God, but that is a journey without end. Recognizing as much requires a blend of hindsight, insight, and foresight that is best achieved when disciplines such as philosophy, science, and theology work together.

Not everyone agrees. By restricting “knowledge” only to that which can be obtained via traditional methods of science, the logical positivists have eschewed this interdisciplinarity and thereby narrowed the scope—with their own peculiar version—for what might count as a final word. But any claims for a final word is always a narrowing of perspective, and logical positivism simply shows that people can be positive about something illogical.<sup>11</sup> Although some folks today sound its death knell, those dirges seem premature as logical positivism has apparently been resurrected in various postmodern guises which attempt to deny any real world at all.<sup>12</sup> Sadly, even theology can be subject to its own positivist twist along these lines, constructing a logical edifice without any foundational premises (other than the claim that there can be none). For both logical and theological positivists, it is indeed the case that, “people look at the outward appearance.”<sup>13</sup>

Certainly, any philosophy of science is subject to becoming the final word. Unfortunately, the very concept “philosophy of science” suggests not only a juxtaposition but also an estrangement of science and the humanities. Yet as the

10. Steve Donaldson, *Dimensions of Faith: Understanding Faith through the Lens of Science and Religion* (Eugene, OR: Cascade, 2015).

11. Compare Ian Hutchinson, *Monopolizing Knowledge: A Scientist Refutes Religion-Denying, Reason-Destroying Scientism* (Belmont, MA: Fias, 2011), 83.

12. Cf. Bernardo Kastrup, *More Than Allegory: On Religious Myth, Truth and Belief* (Washington D.C.: iff Books, 2016). I do not claim that these postmodern views and logical positivism are identical, only that they seem to share similar philosophic DNA.

13. 1 Samuel 16:7.

philosopher Roger Trigg (among others) has taken pains to note, besides being undesirable, the separation is actually impossible (though many fail to appreciate that fact).<sup>14</sup>

While we might expect philosophers to defend their turf, there is good reason to think Trigg is correct, if for no other reason than multiple perspectives appear to be a better bet for unraveling questions that by their very nature cross disciplinary boundaries. When it comes to asking what it means to be human, how we might rationally reconcile randomness and providence, where God fits into an evolutionary scheme, or how meaning arises from mindless mechanisms (among other questions like these), it behooves us to bring as many aids as possible to the task. It is, after all, these big questions that intrigue us. But if things are approached solely through a disciplinary tunnel, the likely result can be (as Trigg suggests<sup>15</sup>) a rigid and dogmatic view. He could have described it as “the final word.”

### **Freedom and Constraint**

Failure to appreciate the need for interdisciplinary study and collaboration inhibits progress toward better answers to important questions of meaning and value, but it is not the only thing. In fact, in many cases it may merely be a symptom of a deeper set of problems.

For example, humans are plagued by a host of fundamental limitations including physically and chronologically confined brains, logically fallible reasoning, and the very nature of many of the most important problems we wish to solve (which can only be approached in approximate fashion).<sup>16</sup> Although there may be little we can do about most of these, some limitations are of our own making—what we might term culture lock.<sup>17</sup> As the Eagles warned us, we are prone to be “prisoners . . . of our own device.”<sup>18</sup> Thus religious individuals from at least the ancient Greeks onwards have expended significant effort “to avoid having to face a fact and reform a bad system.”<sup>19</sup> Thomas Wolfe suggests as much about science in his fascinating (if somewhat loose)

14. Roger Trigg, *Beyond Matter: Why Science Needs Metaphysics* (West Conshohocken, PA: Templeton, 2017).

15. Ibid. See also concerns raised by Paul Feyerabend in *Against Method* (New York: Verso, 1993).

16. Donaldson, op. cit.

17. Giving rise to culture shock when our dreams of finality begin to fall apart.

18. Bill Szymczyk (producer), *Hotel California*, Eagles (Miami and Los Angeles: Asylum Records, 1976).

19. Gilbert Murray, *Five Stages of Greek Religion* (Garden City, NY: Doubleday, 1951), 181. This is Murray’s description of the theological position of the Roman Sallustius and counterparts in the fourth century A.D.

account of the relatively recent reconsideration of universal grammar in the linguistic community.<sup>20</sup> Of course Thomas Kuhn had already made that clear years earlier.<sup>21</sup>

Some of those culturally dominated moments have frequently arisen when theological and scientific ideas collide. But it would be wrong to think that this is a phenomena only ushered in by “modern” science. In a classic example of a bipolar approach to science and religion, the Roman poet Lucretius, in his first century B.C. exposition involving the nature of matter, refers to “the tightened coils of dread religion,” “crimes to which religion leads,” and “human kind . . . miserably crushed . . . beneath religion.” His conclusion? “Religion now is under foot.”<sup>22</sup>

Given subsequent developments in the past two thousand years (especially the advent of Christianity only a short time after Lucretius wrote), that ultimate declaration looks a tad feeble—but so do all flimsy theologies and theories in retrospect. When uttered, however, they are often no more than a condensation of the cultural atmosphere and can carry the authority of a final word. Thinking—much less saying—anything different is all but impossible when so constrained.

Perhaps the most pernicious of these traps is what we will call the “binary fallacy,” a problem which has undoubtedly plagued humans from the outset and is consistently evident today. This is the belief that things must be one way or the other with nary a bridge between. Examples abound, but a few will suffice. Thus attempting to describe a meaningful role for philosophy, theologian David Bentley Hart unnecessarily pits “some real correspondence between mind and world” against “a fortuitous and functional liaison forged by evolution.”<sup>23</sup> But why one versus the other? Binary choices such as this lead Hart to dismiss the possibility of artificial intelligence and the idea of consciousness as emergent, but that then leaves him in a dualistic world that is at least as mysterious as the one he rejects.

One of Hart’s goals is to undermine materialism, but in his book *Consilience* the staunch materialist E. O. Wilson declares that, “Ethical and religious beliefs are created from the bottom up, from people to their culture. They do not come from the top down, from God or other nonmaterial source to the people by way of culture.” He then asks, “Which hypothesis, transcendent or empiricist, fits the objective evidence best?” and concludes, “The empiricist, by a wide margin.”<sup>24</sup> Others would argue, but the problem originates in the framing. Wilson’s sleight of hand is to claim that there is but one choice and it must be between the options he has provided.

20. Tom Wolfe, *The Kingdom of Speech* (New York: Little, Brown and Company, 2016).

21. Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1996).

22. T. Lucretius Carus, *On the Nature of Things*, trans. William Leonard (Charleston, SC: Forgotten Books, 2007)—this, no less, after first dedicating his work to the goddess Venus!

23. David Bentley Hart, *The Experience of God: Being, Consciousness, Bliss* (New Haven: Yale University Press, 2013), 47-48.

24. Edward O. Wilson, *Consilience: The Unity of Knowledge* (New York: Vintage, 1999), 270.

The absence of any possibility of a bridge between competing views can also be seen in a salvo by evolutionary biologist Jerry Coyne and a rejoinder from seminary president Albert Mohler. In his article, the atheist Coyne made an impassioned plea that “science and faith are fundamentally *incompatible*,” proclaiming that science alone is “equipped to find real truth.”<sup>25</sup> In a quick response on his blog, Mohler suggested that science and religion could be friends but wanted to dictate how that friendship should occur.<sup>26</sup> Interestingly enough, despite the different ways these men see both science and religion, Mohler revealed that the similarity between them runs deeper than their zeal, agreeing with Coyne in the end that, “there really is no middle ground.”<sup>27</sup>

This lack of belief in the possibility of any middle ground characterizes the binary fallacy and can even be seen in traditional conceptions of faith itself, which is regularly assumed to be an all-or-nothing proposition. Yet anyone who seriously scrutinizes his, her, or anyone else’s beliefs (be they about science, religion, or what have you) cannot fail to note the graded scale on which most beliefs occur.<sup>28</sup> Falling for the binary fallacy stifles the creativity needed for finding meaningful solutions and deeper insight into difficult issues, and is an easy way to avoid doing the real work of reconciliation.

Fortunately, because the binary fallacy is one of the primary means by which we confine ourselves, we retain the key to breaking free of its grip (and that of other culturally limiting prisons), but any real ability to do so will depend upon how we see both ourselves and that which surrounds us. Thomas Kuhn described an “essential tension” between “convergent” and “divergent” thinking.<sup>29</sup> Convergent thinking toes the party line—which for Kuhn was the reigning scientific paradigm but, for others, might be the current religious orthodoxy—and is in many respects paramount to “the final word.” Divergent approaches provide the chance to see things in a different light and can be radically strengthened by interdisciplinary efforts and collaborations.

In short, freedom means exploration—and unless one is exploring there is little reason to consider him or her free. There is however, something worse than imprisoning ourselves, and that is trying to confine deity. But that is only possible for a small God.

25. Jerry Coyne, “Science and religion aren’t friends” (*USA Today*, October 11, 2010), italics in original. For Coyne, evidently, faith is a synonym for religion.

26. Albert Mohler, “Science and religion aren’t friends?” (AlbertMohler.com., October 11, 2010). The science he would like to see “is not naturalistic”—but does that mean it is supernaturalistic? If so, how can it be science?

27. Ibid. But see (for example) Dennis Venema and Scot McKnight, *Adam and the Genome: Reading Scripture after Genetic Science* (Grand Rapids, MI: Brazos, 2017), 89-90, for a non-binary approach.

28. Donaldson, op. cit., 27-29, 33-54.

29. Thomas S. Kuhn, “The Essential Tension,” in *The Third University of Utah Research Conference on the Identification of Scientific Talent*, ed. C. W. Taylor (Salt Lake City: University of Utah Press, 1959), 21-30.



## On Big and Little Gods (and Ships Passing in the Night)

It would be difficult for anyone seeing the origins debate between Ken Ham and Bill Nye several years ago not to be struck by the almost complete lack of communication between them. Neither seemed prepared to believe it possible that the other had anything to offer of value to his own rigid set of beliefs. While one dismissed deity as mostly irrelevant and the other could not believe that the complexity of evolution might possibly lie within God's expertise, both appeared to be describing a very small god. It is not difficult to think that comparable issues plagued the Mohler and Coyne perspectives.<sup>30</sup> By definition, God is infinitesimally small for an atheist and perhaps barely measurable by an agnostic but, regrettably, the god constrained by anyone's limited vision (Christian or not) may not be much larger (and a god deemed in need of defense is probably too small to merit it). Sadly, a major reason for thinking one has the final word on matters religious or scientific (and which thereby prevents dialogue with others and excludes the possibility of questioning our own views) often boils down to the size of the god one believes to exist.<sup>31</sup>

As it turns out, falling for the binary fallacy is a prime way to limit God, and debates over interpretations of Scripture often provide classic examples.<sup>32</sup> The resulting complications can be disastrous. Thus, crude expectations for the reincarnation of Elijah prevented people from seeing the significance of John the Baptist just as surely as a limited perspective on planetary organization blocked the view of a more intricate and fabulous cosmos that was there all along. Paul Tillich rightly notes: "When the representatives of faith impeded the beginning of modern astronomy they were not aware that the Christian symbols, although using the Aristotelian-Ptolemaic astronomy, were not tied up with this astronomy."<sup>33</sup> Unwarranted literalism implicitly puts God in a box and it is therefore easy to see why Tillich complains that "Literalism deprives God of his ultimacy and, religiously speaking, of his majesty."<sup>34</sup> It is not without justification, then, that Owen Barfield labels literalness the "besetting sin" and connects it with "a certain hardness of heart."<sup>35</sup> Of course unwarranted emphasis on symbolism can be just as harmful. It is difficult not to note a certain irony here.

30. Mohler's claim (Mohler, op. cit.) that "any Christian form of theistic evolution is a contradiction in terms" is really just his way of saying that he cannot imagine how God could have pulled it off. We can all be forgiven for being unable to imagine such things but is it not a trifle arrogant to use that limitation to restrict the Almighty?

31. Cf. Reeves and Donaldson, op. cit., 112.

32. Refusal to be held captive by the binary fallacy is not to deny that there remains a straight gate and narrow way (Matthew 7:13-14). It is not to concede that anything goes but that possibilities are limited only by God, not us.

33. Paul Tillich, *Dynamics of Faith* (New York: Harper & Row, 1958), 82.

34. Ibid, p. 52.

35. Owen Barfield, *Saving the Appearances: A Study in Idolatry* (Middletown, CT: Wesleyan University Press, 1988), 162-63. If literalness is a sin, the pretense of literalness—literal hypocrisy?—may be worse.

Historian Peter Harrison makes a strong case that the change from an allegorical to a literal reading of Genesis actually helped usher in the age of modern science,<sup>36</sup> but it seems equally clear that a literal reading of Genesis has more recently presented for many individuals one of the greatest barriers to acceptance of some of the insights of contemporary scientific theory. In any case, a big God should be able to support a big science and if one is going to take the dust in Genesis literally, it does nothing to diminish God's credentials to note that it was star dust!<sup>37</sup>

It would be a mistake, however, to think that theologians and religious folk (for whom we might expect deity would loom large) are the only ones plagued by the size-of-God problem. Paradoxically, expansive views of the physical universe promoted by many scientists are often not mirrored in anything like an equally expansive theology. Why, for example, could Darwin not have been as broad-minded in his theology as in his science?<sup>38</sup> And why is it okay in the minds of so many people—including the religious—for science to progress but not theology? Of course collective theological insight sometimes does progress—one need only observe the growing understanding of God portrayed in the Bible to see as much. Yet when we are merely at the current end of the movement forward, we are less likely to appreciate that our insights are but a phase in that development.

Unfortunately, no one is immune and philosophers (perhaps especially philosophers of science and religion) are just as subject to a “final word” mentality as are scientists and theologians. In a recent article, for instance, J. P. Moreland ponders whether “cognitive and behavioral authority” comes from the church or the scientific community.<sup>39</sup> But why must only one of these have authoritative merit? In falling prey to the binary fallacy such positions precipitate a stagnant theology where god-of-the-gaps is upended by an even more insidious god-of-the-dead-end. Becoming and remaining aware of this is important for making sense of any hypothesis—scientific

36. Peter Harrison, *The Bible, Protestantism, and the Rise of Natural Science* (Cambridge, UK: Cambridge University Press, 2001).

37. This is a reference to modern cosmological theory which postulates that the heavier elements of which living beings consist were formed in second generation stars (cf. Robert Jastrow and Michael Rampino, *Origins of Life in the Universe* (New York: Cambridge University Press, 2009).

38. Reeves and Donaldson, op. cit., 111-12.

39. J. P. Moreland, “Theistic Evolution, Christian Knowledge, and Culture’s Plausibility Structure,” *Journal of Biblical and Theological Studies*, 2.1 (2017) 1-18. In attempting to support his major thesis, Moreland argues that the church has held a more or less static position on a literal interpretation of Genesis for two thousand years but conveniently ignores the variety of Christian interpretations that have actually been given during that time (including the contextual background of the Genesis and Pauline narratives) (cf. John Walton, *The Lost World of Genesis One: Ancient Cosmology and the Origins Debate* [Downers Grove, IL: IVP Academic, 2009]; Peter Enns, *The Evolution of Adam: What the Bible Does and Doesn’t Say About Human Origins* [Grand Rapids, MI: Brazos, 2012]; Venema and McKnight, op. cit.). Moreland also fails to account for other changes in Christian thinking (some of which he is likely to embrace) (e.g., Phyllis Tickle, *The Great Emergence: How Christianity is Changing and Why* (Grand Rapids, MI: Baker, 2012).

Steve Donaldson: *The Final Word: Prisoners of Our Own Device*

or theological—and its purported evidence. But although that is my final word for this article, it can never be *the* final word. Caveat philosophus...

## ***Book Reviews***

**Dalferth, Ingolf U. *Creatures of Possibility: The Theological Basis of Human Freedom*. Trans. Jo Bennett. Grand Rapids, MI: Baker Academic, 2016. pp. xxiii+217. \$29.99.**

Ingold U. Dalferth is a German theologian whose work is increasingly translated into English, with the result that many more readers benefit from his profound insight into the relationship between theology and philosophy. In this volume, Dalferth offers a deeply thoughtful theological anthropology that is informed by a rich, versatile reading of key sources and figures, especially Martin Luther and (somewhat between the lines) Immanuel Kant. His reflections draw upon an array of insights into particular categories of thought and doctrinal claims. His writing bears witness to a theological reading of human nature for a somewhat diverse readership. Having said this, Dalferth's level of abstraction and his occasional oversights concerning traditions other than his own signal that there are limits to the extent to which his thought will score an impact.

There are several key propositions that Dalferth makes. These seem to be the key ones:

1. Contrary to an Augustinian doctrine of original sin, humans are creatures of possibility, not creatures who possess some deficiency or other.
2. Contrary to certain neo-classical anthropologies of the *imago dei*, human freedom is a practice given us as a gift, not a function of some measureable capacity. We are therefore more passive than active, ontologically speaking. Our awareness of God is not evidence of a capacity to be aware.
3. Our existence is not of our making, a theological claim with more implications for philosophy than theologians have hitherto demanded of philosophers.
4. God's fundamental gift of grace through Jesus' (self-) sacrifice, being not subject to the reciprocity of exchange, is the totally Other that postmodernists such as Derrida and Marion miss either completely or in its fullness.
5. Against philosopher Hans Blumernberg's relegation of God to the category of the 'remembered subjunctive', Dalferth asserts the solidarity of divine saving action, which means that the Incarnation and the resurrection refer to particular eschatological events in the life of Jesus Christ. They are not free floating concepts into which philosophers may insert their own hermeneutic at will.
6. As self-interpreting animals, human creatures are not made in the *imago dei* because of a comparison with other animals but because we are to be compared with God. If we take seriously the critiques of Nietzsche and Darwin, we will

disallow particular capabilities and their origins to define our godlikeness. Instead, our passive orientation to the future will mirror the true image of God, Jesus Christ.

It is challenging to summarize a book which deals with such a variety of claims in a relatively short space. The seven chapters comprising this volume are quite disparate despite the coherence of the first three and the last chapters, and this is the volume's weakness—a lack of cohesion amidst work that emanates from earlier articles. The strength of the book lies in the boldness and comprehensive scope of the individual chapters.

Dalferth has clear ideas that are forcefully made and with few exceptions persuasively expressed. He stands against not only a works-righteousness anthropology, but also a liberal optimism about human self-perfection. For this reason alone, his book is to be welcomed. Especially in the final chapter, Dalferth articulates a definitive response to the now normative belief that humans are no more than animals, yet without hedging the argument on our rationality or a new interpretation of biological capacity that eeks out freedom from the grain of deterministic processes.

In the middle chapters dealing with the postmodernists and with Blumenberg, Dalferth asserts a theological correction to concepts of God that elide grace and salvation. He wants to ontologically bolster latter categories all the while keeping philosophy and theology distinct! This pushes back against an overly philosophical conception of God and human beings generally, by arguing for a delineation of meaning to arise from the biblical text and the doctrinal tradition, independently of human needs. Against a certain tradition within the philosophy of religion, he affirms that “God is not infinitely incomprehensible; rather, he is love in excess” (p. 155).

The book begins with an absolutely critical insight, gained from a consideration of the human species' predicament in the face of the ecological crisis. It is that the implicit narrative of human nature stemming from threats to our existence reveals our creaturely deficiency. The response to a perception of our supposed deficiency is to engage in a steady tempo of activity, which actually worsens the crisis. He returns to the theme of the human predicament on this planet near the end of the book, but does his anthropological reflections supply the *desideratum* he seeks? Partly.

On the one hand, he understands—as too few theologians do—how European thought weighs upon the theological imagination. Figures like Nietzsche, Schoepenhauer and Darwin are deftly handled. Through this philosophical thicket, Dalferth threads a trail of theological markers that could ensure that we not forget our created status: orientation not explanation, human passivity amidst divine activity, faith over knowledge, gift over exchange and the distinction of disciplines over the (Thomist) analogy of being.

On the other hand, for a volume that develops a fresh theological narrative about human nature in the face of our limits, very little is spoken about sin. Ostensibly, this

is because Dalferth sees dangers lurking in a narrative of human deficiency that is traceable to the predominant interpretation of Genesis 3. He is interested in thinking of human creatures as creatures of the future, of possibilities not capabilities that fail. He also doubts the Christian tradition's appropriation of the ancient tradition in regards to body/soul dualism, but only once does he state that this is due to the tradition's association of sin with the body.

As with David Kelsey's *Eccentric Existence*, Dalferth gives the impression on a number of occasions that the one-sidedness of the *imago dei* tradition results from a preoccupation with Genesis 1:26. The hamartiological preoccupations of New Testament writers would seem to indicate some awareness of human deficiency from a created standard below which we are failed images of God. Dalferth prefers thinking of sin as the "ignoring of God." Yet, Paul's recognition of sin as "another law inside me" in Romans 7 suggests something graver.

Grace is the beginning of hope and does not remove deficiency, according to Dalferth (p. 110). But I think we can conceive of grace as both operative (through faith, love and hope) and healing. Dalferth's proposal hinges on a dialectic between the anthropological narratives of deficiency and possibility. Must it be either/or?

With a nod to Luther, Dalferth insists on referring to humans as *pura materia* (p. 79) instead of being substantial forms. But, with Paul, the medieval tradition inherited by Luther largely maintained the material causes of both virtue and vice in the human bodily state of becoming, and while Dalferth acknowledges Luther's dependence upon Aristotle, a fuller retrieval would have put pressure on an anthropology of the future tense.

On every page, Dalferth intrigues the reader and sets for us the serious task of thinking about the question "Who are We?" with verve and boldness. This is the most arresting book in theological anthropology that I have read in years.

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**Bloom, John A. *The Natural Sciences: A Student's Guide*. Wheaton, IL: Crossway, 2015, 127 pages, \$11.99, paperback.**

John A. Bloom (PhD, Cornell University) is a professor of physics; chair of the chemistry, physics, and engineering department; and academic director for the M.A. in science and religion program at Biola University in California. His educational credentials make him uniquely qualified to address the relationship between science and religion as he holds not only a doctorate in physics and ancient near eastern studies, but also a masters in divinity. Bloom has contributed to several books including *Evidence for Faith: Deciding the God Question* (ed. John Warwick Montgomery), and published multiple articles on early creation myths, intelligent design, and human origins. This book is part of a series entitled "Reclaiming the Christian Intellectual



Tradition,” which is dedicated to providing an examination of academic topics from a distinctly Christian perspective.

The purpose of this volume is to introduce students to the natural sciences, and equip the reader with evidence that the Christian worldview provides the best grounds for scientific investigation. Bloom’s passion, which sets the tone for the entire book, is best demonstrated by his statement that “reflecting on God’s handiwork in the world around us gives a depth and life to science that makes it all the more fascinating and rewarding” (p. 6). He begins the book with an outline of the Christian intellectual tradition within science, and this establishes the philosophical framework for the following exploration of the history of scientific spanning from Aristotle through modern times. Next, he examines the definition of science and how methodological naturalism conflicts with Christian theology. Lastly, he delves further into current obstacles in science and offers suggestions on how the Christian perspective is the most advantageous for future scientific advancement.

This text’s greatest strength is the well-constructed foundation Bloom provides on the role of Christianity in science. Having a strong base to call upon is crucial for novice students who wish to start thinking and speaking clearly about the intersection of science and Christianity. It can be difficult in today’s world to be a both scientist and a Christian, however modern science is widely accepted as having its roots in a Christian perspective on nature. Bloom acknowledges that many argue that these two states are not only incompatible but almost considered at war with one another. To address this argument, he calls attention to the fact that both Christianity and science hold very similar, overlapping values: they both place a great premium on good work, which by definition includes high ethical standards, collegiality, and hard work. He highlights this intersectionality by emphasizing that “the Bible teaches that *the study of nature is a worthy pursuit to gain wisdom and glorify God*” (p. 25, italics original). He further strengthens this claim by noting “the application of scientific knowledge for practical and beneficial ends has its root in *the Christian call to relieve suffering*” (p. 26, italics original).

In the final two chapters of the book Bloom explores the current obstacles in understanding science from a Christian perspective and suggests possible solutions. It is here that, in this reviewer’s opinion, some of Bloom’s arguments become a bit weak. For example: when describing the current limits of science in explaining the natural world he states “there is no rational reason why math and logic correspond to the physical world, and our lab measurements can never be precise enough” (p. 76). This position insinuates that precise answers to certain questions will forever be out of humanity’s reach. Several chapters earlier Bloom himself contradicts this argument with the statement that “Years of work and study are necessary to develop the equipment and the mathematical tools that allow us to model what exactly is happening in the physical world” (p. 27) implying that though perhaps we do not currently possess the tools to fully comprehend the world, hard work and patience will

yield the necessary equipment for greater understanding. He also points out that the Scriptures portray God as “designer, sustainer, and caregiver of his creation” (p. 30), thus offering the argument that all of the known universe is God’s creation. From this perspective, one can extrapolate that all of science, and therefore all scientific results, fall within His kingdom. Consequently, the limits of our knowledge are defined by God, and claiming that our equipment can never be precise enough suggests that humanity has the ability to act independently outside of God’s creation to examine creation itself. Fortunately, these faults are minor and detract only slightly from the valuable suggestions Bloom offers; such as recommending tolerance for diversity of theological and scientific view points, and a reminder that displaying Christian character and values in work, scientific or otherwise, is critical for modeling a positive example for others.

For budding scientists or students of biblical and theological studies, I recommend *The Natural Sciences: A Student’s Guide* as it combines an easily digestible, historical overview of the Christian intellectual tradition in science that additionally provides a strong conceptual framework for understanding current scientific debates. I would also recommend this book for more advanced scientists who are searching for assistance with reconciling the expectations of being a Christian in science. For further reading into the early history of Christianity’s role in modern science one may also wish to read James Hannam’s *The Genesis of Science: How the Christian Middle Ages Launched the Scientific Revolution* (Regnary Publishing, 2011). Alternatively, for further reading into the debate on the role of Christianity and God in more current scientific research John C. Lennox’s *God’s Undertaker: Has Science Buried God?* (Lion Hudson, 2009) is an excellent resource.

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**Reeves, Josh A. and Steve Donaldson, *A Little Book for New Scientists*. Downers Grove, IVP Academic, 2016, pp. 141, \$12.00, paperback.**

A book title by an evangelical publisher purporting to provide help for scientists immediately raises questions in today’s overheated world of Christianity in relation to science. But this is precisely the purpose of this truly little blue book (7 x 4 x ½ inches). And for such a small work, the authors do a remarkably good job of at least pointing out to us the right questions.

The authors teach that the scientist can expect felicitous surprises (e.g., opportunities for mission and ministry) as well as trials for their Christian faith (e.g., science-religion conflicts). The latter can lead to intellectual crisis for Christians. So the authors state: “The primary purpose of this book, then, is to help Christians studying and practicing in the sciences to connect their vocation with their Christian faith” (p. 13).

The authors, who teach at Samford University in Birmingham, Alabama, are well-qualified to write such a book. Reeves serves as a project administrator in the university's Center for Science and Religion (CSR), managing the New Directions in Science and Religion project. Donaldson, who co-founded the CSR, directs the school's computer science program and co-directs the computational biology program at Samford.

The book packs in much perspective and practical help for Christians working in the sciences. For example, believers need to be involved in science for ethical reasons. Issues such as the ethics of genetic alterations need the input of Christians. They rightly note that science is not a completely dispassionate discipline with no political pressures. Christians may well need courage to address difficult issues. And Christians at times will be forced to address contentious issues such as Darwinism or global warming.

Christians may also face special tests of their faith, such as the temptation to be jealous of unbelievers who feel no time constraints like family and church in the pursuit of their careers. At the same time, believers are not exempt from having to deal with rejection in the form of failed experiments or rejected journal articles. Working in community with other scientists can help promote Christian humility and protect against the intellectual pride of personal achievement.

The authors rightly note that much of western culture labors under a myth of necessary warfare between science and religion. Not only is this incorrect today, but the history of science reveals many important scientists who were devout Christians. Faithful believers working today in the sciences can help counteract the myth that science and religion need be independent or adversarial. And scientists who are Christians can influence a watching world by the way they live.

Reeves and Donaldson address the relationship of God's two books, Scripture and creation. They helpfully note the two books neither have the same message nor speak the same languages. They argue the Bible is more important because it deals with matters of eternal importance. And they recommend the age old foundational assumption: "If we find places where nature and Scripture disagree, then it is a mistake of the readers—we simply have not read one or both of the texts correctly" (p. 24). The chief example of science correcting biblical interpretation was the discovery that the earth does move. Of course, knowing just when apparently conflicting scientific theories have been empirically verified can be difficult. But Christians must wrestle with the details "so that we may resist those who would use the authority of science to support anti-Christian conclusions. In such cases, Christians should not surrender basic beliefs in the name of 'science'" (p. 27). The authors wisely note that if believers seem more defensive than others, "it is not necessarily because they are less astute than others but because they believe they have more to lose" (p. 85). Christians believe in some absolutes that should not be compromised.

The authors devote chapter 7, “Science and Scripture,” specifically to these issues. Their general principles for interpreting biblical passages in apparent conflict with science are wise. (1) Christians should realize that “an uncompromising commitment to the inspiration and authority of Scripture does not mean we should have an uncompromising commitment to *our own* interpretation of Scripture” (emphasis theirs, p. 94). Even the Holy Spirit’s dwelling in the Christian does not assure infallible biblical interpretations. (2) Believers working in the sciences need community, especially the help of quality teachers who are intellectually rigorous and who exemplify Christian character. (3) Believers need pay careful attention to the important differences between the genres found in the Bible. (4) And if we are to know what Scripture means for us today, we should seek to understand what it meant to its first readers.

The authors concede that a higher percentage of atheists reside in the highest guilds of scientists. The nature of science, however, is not the reason but rather the sociological impact of the prevailing climate of the discipline. Just because scientists are experts in their specific disciplines does not mean they are experts in opining on ultimate questions about God: “Ultimately, however, the main reasons a scientist might be an atheist come down to too large a view of science, too tired a view of religion and too lofty a view of humans (and their success in science)” (p. 108).

At times this little book might read a bit too philosophical for some readers (e.g., “Our values function as auxiliary hypotheses, indirectly influencing the beliefs formed about our direct experience” [p. 50]). But most readers looking for help relating their faith with their scientific vocation will glean much practical wisdom. Indeed, the greatest strength of the book is its practical, godly advice. And none is more important than the Christian needs to trust that serving God is what counts most in the end.

The book’s usefulness may well be limited among conservative evangelicals due to the authors’ evolutionary commitments. Though they do not push theistic evolution, they assume it. The recommended reading list at the back of the book presents a variety of important books, but they are largely evolutionary creationist in orientation. With the influential advent of BioLogos, more traditional evangelicals are more informed about controversial theological issues seemingly associated with a commitment to evolution. These issues extend beyond universal common descent and human evolution. Conservative readers of this book, therefore, might be inclined to wonder just where the authors might land on specific issues they raise.

For instance, the authors suggest that those seeking to challenge the myth of necessary warfare between science and religion will sometimes appear to have “abandoned certain cherished positions traditionally held by either community” (p. 13). The reader will assume the authors at the very least refer to abandoning the rejection of human evolution. An ostensible example of a cherished position in the scientific community needing to be abandoned is that science has provided “a good

scientific model” to account for those things “humans find most significant in the world” (p. 41), such as love of parents or children. But do the authors mean to say they really reject an evolutionary account of familial love, or just that such accounts cannot serve as the ultimate explanation. Again, evangelicals wary of the wide reach of evolutionary thinking are particularly uncomfortable when the nature of human beings are at stake. This wariness includes not only evolutionary accounts of human bodies but also of human minds, morals, wills, and religious beliefs. How would the authors recommend Christians respond to these positions in the scientific community?

Apologetics gets rightly scolded for defending beliefs held without good reasons. But what do the authors have in mind? They state that science will undercut only those beliefs that cannot withstand scrutiny and deserve to die. Do they have certain beliefs in mind to help the struggling reader? On the other hand, Reeves and Donaldson write that “Christian scientists can . . . help dispel the myth that Christianity is not based on evidence” (p. 130). What scientific evidence do they have in mind? Evolutionary creationists have typically been committed to methodological naturalism, as are the authors. They admit the doctrine is controversial among Christians, and they only gently defend it (not metaphysical or “scientific” naturalism [p. 41]!). But ever since Darwin, commitment to methodological naturalism has typically served to undercut rather than undergird appeals to science in apologetics. So it would have been helpful for the authors to provide examples of scientific evidence in support of Christianity.

The authors rightly note that Christians working in the sciences can contribute to the education of ministers and congregations. But in this context they state: “A God of infinite attributes cannot be fully described in a finite book, and there is no reason to think that God would limit himself to a single source. . . . The fact is, modern science has provided a different view of the world than was available to the people who wrote and originally read the various parts of the Bible (which were different people at different times)” (p. 123). Again, one could wish for examples from the authors. Indeed, at the end of the book the authors tantalize us with questions for which they provide no answers: “Where is the soul in a physical brain? What does modern neuroscience suggest about free will? What does it mean to be human in an evolutionary context? Will transhumanist endeavors change our understanding of being made in God’s image? How does meaning arise from mindless mechanisms? How does the apparent randomness seen in nature relate to God’s providence? For each of these questions (and many others) modern science provides insights that can help frame understanding and stimulate thinking” (p. 134). Aside from the aspects of those questions which mention theological concepts (soul, God’s image, God’s providence), many contemporary scientists provide answers such as the following: there is no non-corporeal soul (physicalism) nor free will; what is most interesting about humans derives strictly from our animal past; and concepts such as meaning and providence are themselves evolutionary byproducts. No doubt our authors would

not answer the questions this way, but one might certainly wish they had provided the “insights” they believe modern science provides.

In the end, the book will be most helpful for Christians who already are committed to evolution and methodological naturalism but not to full biblical inerrancy and traditional evangelical theology. More conservative evangelicals will be nervous about questions raised without answers in the book. And these evangelicals will be disappointed because they were probably looking for more answers.

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**Applegate, Kathryn and J. B. Stump, eds. *How I Changed my Mind about Evolution: Evangelicals Reflect on Faith and Science*. Downers Grove, IL: InterVarsity Press, 2016, pp. 196, \$10, paperback.**

Kathryn Applegate and J. B. Stump are the Resources Editor and Senior Editor, respectively, at BioLogos—a Christian organization whose mission is to advocate a view of “harmony between science and biblical faith” rooted in “an evolutionary understanding of God’s creation” (<http://biologos.org/about-us>). Applegate holds a PhD in computational cell biology from The Scripps Research Institute. Stump, who recently authored *Science and Christianity: An Introduction to the Issues* (Wiley-Blackwell, 2016), holds a PhD in philosophy from Boston University.

*How I Changed my Mind about Evolution* is a collection of autobiographical essays from evangelical Christians who believe the theory of evolution is compatible with the truth and authority of the Bible. Among its twenty-five contributing authors are pastors, Bible scholars, theologians, philosophers, and scientists. Some are distinguished scholars with doctoral degrees from Oxford, Yale, Harvard, Berkeley, or MIT. Eight have doctorates in the biological sciences, and two of these biologists—Denis Lamoureux and Jeff Hardin—have additional graduate degrees in theology. Two other contributors hold prestigious positions in the scientific community: Jennifer Wiseman is a Senior Astrophysicist at the NASA Goddard Space Flight Center, and Francis Collins (who founded BioLogos in 2007) is director of the National Institutes of Health and former director of the National Human Genome Research Institute.

As the title suggests, most of the contributing authors changed their views about evolution. Some had previously opposed evolutionary science because of its perceived conflict with Scripture; others formerly rejected Christianity for the same reason. The essays in this book are their personal testimonies, explaining why and how they came to see things differently. (An exception is the essay by British scholar N. T. Wright, professor of New Testament at St. Andrews, who offers an outsider’s perspective on the evolution “culture war” in America.)

Though their stories differ dramatically, several patterns emerge. One central theme is the intellectual and spiritual struggle many Christians experience as they



wrestle to understand how the teachings of Scripture relate to the scientific evidence for evolution. For each of the contributors to this book, that cognitive dissonance was resolved by accepting what BioLogos calls *evolutionary creationism*—the view that evolution was God’s chosen instrument for creating the diversity of life on this planet. Some of the writers describe feeling joy and peace when they came to see Scripture and evolutionary science in harmony. Another common element running throughout their testimonies is a theme of praise to God for what He has done: expressions of awe at God’s creative power to establish and uphold the laws of nature, wonder at His ingenuity in ordaining natural processes to fill the earth with endless varieties of life, gratitude for His faithfulness to sustain the universe and protect life’s fragile existence over billions of years. Regardless of whether one agrees with these evolutionary creationists’ perspective, their testimonies dispel any doubt about the authenticity of their love for God, for His word, and for His creation.

A more troubling theme surfaces when the authors describe their experiences in the evangelical Christian community. Some recount how their church’s haughty and dismissive attitude toward science was a stumbling block in their spiritual journey, or worse, a barrier to faith for their scientifically-educated friends and colleagues. Others tell how they faced personal rejection and alienation from their brothers and sisters in Christ, when word got around that they believed in evolution. Pastor John Ortberg relates a conversation he had with believing scientists who expressed their loneliness. “When I’m at work and I’m with a bunch of scientists, they’re really skeptical about my faith,” they told Ortberg. “When I go to my church, they’re really skeptical about me because of my science. I feel like I don’t have a place where I really belong” (p. 94).

These stories are unlikely to change anyone’s mind about evolution, but they may and should soften our hearts toward Christians who hold differing views on the topic. That is the central aim of this book. In their editorial introduction, Applegate and Stump admit that the book barely discusses the evidence for evolution at all. What it does present is evidence, in the form of twenty-five compelling testimonies, that sincere followers of Christ can come to believe in evolution while remaining convinced of the truth and authority of God’s word. James K. A. Smith, a philosophy professor at Calvin College, writes in the first chapter that an important step in his spiritual growth occurred when he recognized that Bible-believing Christians do not all agree on how to interpret the scriptural account of creation, much less on how to interpret the scientific evidence:

The examples of historic figures like Augustine and Calvin and Warfield had helped me see that orthodox Christians could hold a range of positions on creation, evolution and human origins. And so the tent of the faithful was enlarged beyond the small circle of young-earth creationists. It was less a matter of having changed my position and more a matter of recognizing that a range of positions could be consistent with orthodox Christian confession (p. 27).

Reading testimonies like Smith's probably will not influence your views about evolution, but it might broaden your perspective on the church. The members of Christ's body are not all alike. We do not all have the same function (Rom 12:3-8), and we certainly do not always agree even on issues foundational to our faith. I encourage you, my fellow evangelicals, to read these testimonies and prayerfully consider how we—as diverse members of the body of Christ—can accept one another with open hearts and humble minds (Rom 15:1-7) while remaining steadfast in the truth of God's word.

On the other hand, *caveat lector*: to readers unfamiliar with the tentative nature of science in general and the complexity of evolutionary biology in particular, some of the essays in this volume may give the misleading impression that science has conclusively settled the question of how life arose, and that the theory of evolution fully explains the diversity of life on Earth. In fact, however, the ultimate origin of the first living organism remains a subject of speculation; and the theory of evolution—even as an explanation of the diversity of species—is incomplete. The primary mechanisms of evolution (genetic recombination, mutation, and natural selection) are well-understood, but some other causal factors are mysterious, and interpreting the fossil record is far from straightforward. There is plenty of room for Christians to disagree about the interpretation of scientific evidence, just as we may disagree about the interpretation of Scripture.

The editors and contributing authors of this book obviously want to heal a division in the church, but a careless reading might have the opposite effect. It would be a shame if their testimonies convinced anyone that full acceptance of the prevailing scientific theories is the *only* reasonable position, thereby exacerbating the polarization between Christians who embrace evolutionary science and those who reject it. To their credit, a few of the contributing authors do mention that there are unsolved puzzles in evolutionary science—as there are in any other domain of scientific inquiry. However, it is worth emphasizing that scientists themselves disagree about many aspects of evolution; similar disagreements between Christians are inevitable.

Moreover, readers should bear in mind that the prevailing account of biological origins is not monolithic, but consists of numerous distinct theories pieced together by scientists working in a variety of disciplines. Biochemists, biophysicists, and geneticists together give an account of the processes by which hereditary features may change over time; paleontologists try to map out a coherent history of the evolutionary variations that have occurred in the past; geologists and ecologists try to explain why those variations occurred in terms of environmental changes throughout Earth's history, and so on. Like all scientific theories, the theories that comprise modern evolutionary science are amenable to revision in light of new evidence. Perhaps the current theories are mostly right, or perhaps scientists have gotten some things badly wrong—as has happened innumerable times throughout the history of science.

Regardless of where we stand on these issues, the wise and loving thing to do is to listen respectfully to each other, not write off our brothers and sisters as heretics, piteous victims of deception, or ignoramuses whenever they see things differently. That is the invaluable lesson to be learned from the testimonies in this book.

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**Joshua R. Farris. *The Soul of Theological Anthropology: A Cartesian Exploration*. London, UK: Routledge, 2017. pp. 198. \$119.96, hardback. \$38.47, ebook.**

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Nearly 30 years ago, John W. Cooper wrote and published his widely read theological defense of substance dualism and the doctrine of the intermediate state: *Body, Soul, and Life Everlasting*. To this day, when one researches Christian accounts of the afterlife and attendant accounts of the human person, Cooper's work is ubiquitous. Indeed, *Body, Soul, and Life Everlasting* has been something of the "gold standard" by which all defenses of the doctrine of the intermediate state and a theological defense of substance dualism have been measured. By my lights, that reign ends with the publication of Joshua Farris's book, *The Soul of Theological Anthropology*. Farris is clear that his theological account of the human person "is motivated and influenced by John Cooper's . . . work" and that he intends to "take some of Cooper's conclusions forward" (p. 6). To my mind, Farris accomplishes what he sets out to do. Indeed, so I say, Farris's monograph should be the text to which one appeals when one wants the most cutting-edge, thorough, and clear theological defense and construction of a substance dualist anthropology and doctrine of the intermediate state.

Setting his book out in four parts, Farris aims to provide a theological defense of and a constructive account for *Cartesian* substance dualism. By 'Cartesian substance dualism,' Farris means a particular class of "person-body substance dualism" that is "a broad category of substance dualism that describes persons as strictly identical to souls (i.e., an immaterial concrete part) or supervening on souls in contrast to bodies" (p. 2). The idea is that specifically *Cartesian* dualism suggests that *persons* are not composite entities. They are (or supervene on) souls. On a Cartesian account, a human person's body is, to use a modal term, *accidental* to her. It is not required for the person's identity or life. In the contemporary literature, this sort of view of human persons is attacked by philosophical, theological, and scientific arguments. In light of this, Section 1 of the book offers a number of preliminary philosophical and natural theological questions to begin countering some of the contemporary arguments. Moreover, in the second chapter

of Part 1, Farris engages with a number of strictly theological and biblical critiques. This part of the book is useful for clearing away some of the conceptual clutter before Farris can begin to build his constructive proposal, which he begins in Part 2.

Part 2 (chapters 3-5) begins his constructive work. Here he provides a model of the soul's creation that he calls "emergent creationism" (p. 76ff). What Farris attempts to do in these chapters is admirable; he interacts with leading philosophy of mind literature *vis-à-vis* the mind/soul's interaction with the body, what that might tell us about from where the soul/mind comes, and also interacts with various streams of thought in Christian tradition (e.g., creationism and traducianism). Farris's emergent creationism (EC), blends William Hasker's emergent substance dualism with traditional notions of creationism (the thesis that God specifically and unilaterally creates a soul for each human body. Traducianism is the thesis that God created one soul, viz., Adam's, from which all other souls descend). In sum, Farris's EC suggests that, at the point at which a particular human body's potentiality for interacting with an immaterial mind emerges, God creates a human soul/mind fit specifically for that body. The body's being ready to receive a soul is thus a *necessary condition* for the soul's being created for it. The necessary condition for the soul's union with the body *emerges* with the body's fitness for being ensouled. Helpfully, EC avoids having to explain how a non-physical entity (e.g., a soul) could emerge as a product of material/physical causes (i.e., material/physical causes are not a sufficient condition for the soul's coming to be on Farris's account as they are, for example, on Hasker's). It also provides a ready-to-hand explanation for why souls and bodies are linked.

Parts 3 and 4 (chapters 6-9) of the work are a more strictly (but not solely) theological analysis of Cartesian dualism and EC. And, aside from the development of EC, I think Part 3, in particular, is the most valuable contribution of Farris's work. For, taking EC in hand, he provides new ways for thinking about the transmission of original sin/guilt from Adam to Adam's progeny (including you and me). Says Farris: "a story could be told that allowed for the direct transmission of original sin . . . because of the intimate relationship of souls to bodies and souls to other souls connected through one long interconnected biological chain" (p. 126). Given EC, there is meant to be a more natural accounting for why a human soul and its human body are linked, and, as such, why there is a certain sort of biological explanation for a soul (and, with the biological explanation, a purported hereditary line to Adam's original guilt).

Chapters 7-9 provide an account for afterlife that attempts to give reasons for a theologian to affirm the intermediate state, the Beatific Vision, and the necessity of the bodily resurrection. Here Farris provides some nuanced and novel Cartesian approaches that help Cartesianism sit more comfortably in Christian theology than some might initially think is possible. One feature of his version of Cartesianism is that souls are specifically *human* souls; they are *meant* to be united to *human* bodies. Because of the EC account, Farris is more able to tie a human soul with a human body, thus giving an account for why a human should be embodied in the

resurrection than other dualist views might. To my mind, any attempt to strengthen the Christian's reliance on the hope of resurrection is a good attempt. Moreover, one of the strengths of this section, and the book writ large, is that Farris is able to interact with contemporary leading biblical scholars (e.g., N. T. Wright). This too helps Farris's book surpass Cooper's, even if this is a matter of historical coincidence (i.e., the research just was not available 30 years ago).

Now, I have published elsewhere a number of reasons for thinking that substance dualism is either false or unmotivated for Christian theology. I will not rehearse all of those reasons here. What I will say, though, is that, even though I think this book is a terrific effort and a contribution to the field that surpasses Cooper's well-attested book, it still does *not* provide clear enough reasons to think that bodily resurrection is not *at all* superfluous for Christian hope. On Farris's account, one can be denuded of one's body and still exist in the Beatific Vision (an incredibly great state of existence). So, the body is superfluous for the Beatific Vision. To be clear, Farris (as well as Cooper and others) suggest that the bodily resurrection is of vital importance. But, it is *not* clear, so I say, why the resurrection *is* of *vital* importance in Christian thinking and hope. For, if there were no bodily resurrection, given Farris's account, one would still be in the Beatific Vision. But this kind of conclusion is not, in my view, fitting with what the Bible suggests is the all or nothing hope the Christian should place on God's bodily resurrecting humans (and redeeming his material creation). To wit: "if there is no resurrection of the dead . . . then our preaching is in vain and your faith is in vain" (1 Cor 15:13-14). I, for one, *desperately* wish for a dualist to engage specifically with this sort of critique. I desire a clear explanation for why someone in the Beatific Vision that is missing an accidental feature of herself (e.g., her body) would so much as care that she is missing it, let alone be in such a state that Paul suggests, were she left there, she would be "of all people most to be pitied" (1 Cor 15:18). Though Farris examines 1 Corinthians 15 (pp. 139-140), I think it is entirely too cursory and simply does not deal with the logic of the argument.

My own position on the matter notwithstanding, and a few other reservations I haven't the space to address, *this* book is the new leader in the field for a theological defense and construction of a substance dualist anthropology and a doctrine of the intermediate state. For upper level undergraduate students and graduate students interested in theological anthropology and life after death, this is now a "go-to" resource. Though it is technical in places, the patient student should be able to navigate its arguments. Moreover, I think that the book's attention to theological, philosophical, biblical, and scientific detail is a model for how up-and-coming theologians and Christian students should approach their work. This book is an object lesson in doing good theology. So, in the same way that Cooper's work peppers the discussion to date, I hope that Farris's work will do likewise. It should.

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**Craig, William Lane. *God Over All: Divine Aseity and the Challenge of Platonism*. Oxford: Oxford University Press, 2016, pp. 242, \$80.00, hardback.**

*God Over All* is an expansion of William Lane Craig's 2015 Cadbury lectures. A more in depth volume on God and abstract objects is forthcoming with Springer Publishing. This work then can be considered as a succinct summary of Craig's research on the topic. Given that this is the case, we should judge this work in light of the aforementioned context.

Craig begins the volume by defining the problem of God and abstract objects. The idea is something like this: Classical theism sees God as *a se*, that is, God does not exist through another or from another; instead it is he who is responsible for all of reality (p. 1). And yet, if Platonism – the thesis that there are abstract objects which are eternal and immaterial – is true, God would not be *a se*. Craig gives the following as an example of why this would be the case:

Consider the cluster of divine attributes which go to make up God's nature. Call that nature deity. On Platonism, deity is an abstract object existing independently of God, to which God stands in the relation of exemplification or instantiation. Moreover, it is in virtue of standing in relation to this object that God is divine. He is God because He exemplifies deity. Thus, on Platonism, God does not really exist *a se* at all. For God depends upon this abstract object for His existence (p. 43).

The first part of Craig's work is a biblical and a historical defense of the traditional Christian view that God is *a se*. In reference to the biblical defense, some of the texts which Craig thinks are incompatible with Platonism include John 1, Colossians 1:15-16, and Romans 11:36 (pp. 22-27). As it pertains to church history, Craig references Harry Austryn Wolfson in pointing out that the Church Fathers affirmed the following three points which are all incompatible with Platonism: (1) God alone is uncreated, (2) nothing is co-eternal with God, and (3) eternity implies deity (p. 34).

Following his biblical and historical case against the compatibility of classic Platonism and Christian belief, Craig examines what he sees as the most serious argument for Platonism: the Indispensability Argument. This argument does not necessarily prove Platonism but rather the existence of abstract objects. Thus, the Indispensability Argument is really an argument for realism. Referencing M. Balaguer, Craig gives the following version of the Indispensability Argument:

- I. If a simple sentence (i.e., a sentence of the form 'a is F', or 'a is R-related to b', or ...) is literally true, then the objects that its singular terms denote exist. Likewise, if an existential sentence is literally true, then there exist objects of the relevant kinds; e.g., if 'There is an F' is true, then there exist some Fs.



- I. There are literally true simple sentences containing singular terms that refer to things that could only be abstract objects. Likewise, there are literally true existential statements whose existential quantifiers range over things that could be abstract objects.
- I. Therefore, abstract objects exist (pp. 45-46).

In seeking two alternative realist views (views which although affirm that abstract objects exist, deny that such objects eternally exist in the way the Platonist advocates) to classic Platonism that the Christian can endorse, Craig examines Absolute Creationism (the view that God creates abstract objects and thus abstract objects are not eternal) and Divine Conceptualism (the view that God's thoughts functionally play the role of abstract objects). Craig ends up rejecting these views and relies heavily on arguments found in Paul Gould's *Beyond the Control of God?: Six Views on the Problem of God and Abstract Objects* in doing so.

Given that classic Platonism is not compatible with Christian belief and given that, according to Craig, Absolute Creationism and Divine Conceptualism have major issues, in order to undermine the Indispensability Argument, Craig encourages his reader to look more seriously at anti-realist views. The views that are engaged include fictionalism (abstract objects are merely useful fictions) and figuralism (abstract objects exist but only in a figurative sense), and neutralism (first-order logic is not ontologically committing). After Craig attempts to make plausible such views from objections, Craig thinks that he has established several alternatives to Platonism that Christians can utilize in response to the problem of God and abstract objects. Craig himself does not advocate for just one of these anti-realist views but is convinced that a combinational approach is most plausible (p. 207).

But is Craig right? Moreover, should Craig's work be seen as adding something unique to the literature on God and abstract objects? While the reader will have to make up her own mind as it pertains to the former of these questions, I think the answer to the second question is yes. However, it is not obvious to what extent it contributes to the literature. While Craig's biblical and historical analysis is extremely helpful, his work has some weaknesses. For example, in his chapters on anti-realist approaches to abstract objects, his engagement with objections to such anti-realist views is often very brief. This is unfortunate because, as one can see in Gould's volume, there is indeed a lot the realist can say in response to Craig's arguments. This is not to say that Craig has not offered short and successful arguments for his position, but there is much more to be said.

On a similar note, outside of the Indispensability Argument, Craig does not pay attention to other arguments for realism. As Gould and Davis make clear, there are other reasons for considering realism (Paul Gould's *Beyond the Control of God?: Six Views on the Problem of God and Abstract Objects* [New York: Bloomsbury Press, 2004], 129-130). In fact, it is not even clear from reading Gould and Davis

that they think that the Indispensability Argument is the best argument for realism. These issues, however, do not seem very damaging if one remembers that this work is only a condensed work of a more robust work that is forthcoming. If one reads this book as something more like an extended primer or an introductory defense of anti-realism, then it is clear that this book makes an important contribution. I am confident that evangelicals who are unfamiliar with this debate or who have never seriously considered anti-realism, will be deeply challenged by Craig's arguments and will see anti-realism as a serious and plausible option.

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**Gould, Paul M. and Richard Brian Davis, eds. *Four Views on Christianity and Philosophy*. Grand Rapids: Zondervan, 2016, pp. 240, \$19.99, paperback.**

Perhaps reflecting the influence of his colleague, Rudolf Bultmann, Martin Heidegger makes what at first seems a curious statement in a 1927-28 lecture entitled "Phenomenology and Theology": "there is no such thing as a Christian philosophy" (in *The Piety of Thinking*, James G. Hart and John C. Maraldo, eds. [Bloomington: Indiana University Press, 1976], 21). For Heidegger, philosophy examines the most basic of human pursuits (the question of Being) while all other disciplines (including theology) examine various aspects of Being. Some in the Society of Christian Philosophers may disagree, but Heidegger is basically correct—if by *Christian* philosophy one means a philosophy that differs in *kind* from other alleged types of philosophy.

Philosophy, though, properly understood, is not a set of beliefs or method of analysis that is susceptible to qualifying titles such as "Christian," or "atheistic," or Buddhist." This is not to say that one who is a Christian may not philosophize differently from one who is an atheist, or a Muslim, or a Buddhist. The practitioner changes while the *practice* does not—or, at least, it should not. The tension evident here is brought into relief by the contributions to *Four Views on Christianity and Philosophy*, edited by Paul M. Gould, associate professor of philosophy and Christian apologetics at Southwest Baptist Theological Seminary (Fort Worth, TX) and Richard Brian Davis, professor of philosophy at Tyndale University (Toronto, Canada). The following review will highlight elements of each contribution and conclude with a comment about the book's format.

Each of the four views offers definitions of Christianity and philosophy so that each contributor can agree upon what it is that they discuss. Though this does not always happen, the definitions are reasonably similar for a conversation to commence. Graham Oppy's view, called the "conflict model," is presented first and he does an admirable though incomplete job of defining philosophy as a "domain of

inquiry” (p. 23). His understanding of Christian faith at first appears too generic to be useful (pp. 21-22), but he adds necessary specificity when he gets to his focused critique showing why there is conflict with philosophy (pp. 32-40). Oppy’s way of defining philosophy neutralizes it from the start; as a domain of inquiry philosophy does not require a presuppositional commitment to a system of belief, but merely a commitment to answering questions for which there are not agreed upon answers using agreed upon methods of inquiry. Such consensus—agreeing upon answers and methods—is something philosophy has never enjoyed and is unlikely ever to enjoy. Thus, Oppy’s definitions are insufficient to establish a conflict; Oppy certainly thinks there is conflict—but it is more apparent than real. The conflict, for Oppy, comes not in his definitions but in his assumption that naturalism is true. He had defined philosophy in such a way that it does not *require* a presuppositional commitment, but he has such a commitment—to naturalism—which makes his philosophizing antithetical to Christianity (pp. 41-47). So, Oppy shows us not that philosophy and Christianity are at odds, but that *naturalistic* philosophy and Christianity are at odds. (A similar case is made in the relationship between religion and science by Alvin Plantinga, *Where the Conflict Really Lies* [Oxford University Press, 2011].)

Scott Oliphint’s view, called the “covenantal model,” is like Oppy’s in that it, too, sees philosophy and Christianity as opponents—but for very different reasons. Oliphint’s Christianity is rather narrowly defined and requires assent to natural and special revelation as foundational for all human endeavors (pp. 72-81). Though this poses few problems for Christians, saying that the foundation for human inquiry rests in *revelation* poses serious problems for those uncommitted to Christian faith. And this is why Oliphint’s and Oppy’s views are opposite sides of the same coin: Oppy’s presuppositions involve the unquestioned truth of naturalism, whereas Oliphint’s presuppositions entail the unquestioned truth of divine revelation (both natural and special). With such presuppositions in place, there is little wonder why each views philosophy and Christianity as adversaries. Only on the basis of adopting Christian *principia* (or foundations) can faith and philosophy be something other than conflictory (pp. 87-94). Like Oppy, Oliphint has not shown that philosophy and Christianity are inimical to each other, only that without a precommitment to Christian faith, philosophy is at odds with that faith.

The third option, the “convergence model” presented by Timothy McGrew, helpfully recognizes that philosophy “is not a set of substantive beliefs . . . it is a discipline” (p. 124). With this more neutral understanding of philosophy, McGrew argues that philosophy confirms Christian faith. McGrew qualifies this neutrality suggesting that some presuppositions are necessary, such as the laws of logic (p. 125) and natural theology (pp. 128-30). McGrew’s method may be called a two-step approach. With certain non-theological precommitments in place (i.e., the laws of logic) one is able to present “evidence” for God’s existence through arguments or proofs such as the Kalam cosmological argument (pp. 131-34). This first step

demonstrates the plausibility of generic theism. Only with a second step—the presentation of scriptural data—can one draw a sharper image of *Christian* faith (pp. 141-50). Since McGrew begins with a neutral dialogical space, his convergence model can be only persuasive, not compelling (p. 150). His model fits well with what is called classical apologetics.

In the final option, the “conformation model,” Paul Moser recognizes the superiority of Christian faith (like Oliphint’s covenantal approach) and claims that philosophy conforms to that faith. Because God’s wisdom is prior to and superior, all other forms of human wisdom must (eventually) conform to divine wisdom (pp. 177-78). Moser defines philosophy closely to its etymological form (i.e., “love of wisdom”); though he sees elements of praxis, he views philosophy chiefly in terms of content (pp. 178-80). The content of philosophy serves Christian faith through a “kingdom-enhancement requirement” (p. 196). This requirement helps avoid undue speculative pursuits that do not promote Christ’s wisdom. Given these features of Moser’s view, philosophy—as traditionally understood—is not separable from Christian theology at all, but is simply another means of advancing divine wisdom for the sake of the kingdom.

The format of the book is excellent. After each view is presented the other three interlocutors are provided space to respond followed by a rejoinder. It is this dialogical feature that is so helpful. Indeed, one learns as much—or more—from the back-and-forth responses and rejoinders as one does from the original expositions. And this feature also accents what is becoming a standard philosophical observation: that all philosophy is hermeneutical, perspectival, and its future must be dialogical if its significance is to survive. As long as there is dialog, there is philosophy, and thus philosophy is not merely a domain of inquiry (Oppy) but a province of discursive negotiation. As such, philosophy is hardly antagonistic to Christian faith but is a welcome dialog partner in the human—that is, common—quest for truth and understanding.

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**Buckareff, Andrei A. and Yujin Nagasawa, eds. *Alternative Concepts of God: Essays on the Metaphysics of the Divine*. New York: Oxford University Press, 2016, pp 299, \$51.80.**

The renaissance of philosophy of religion in the 20<sup>th</sup> Century brought with it an in-depth exploration of the metaphysics of theism. Other alternatives to theism have been explored such as pantheism and panentheism. Yet, these alternative models of God have not been given the same level of attention as theism in contemporary philosophy of religion. The collection of essays in *Alternative Concepts of God* seeks to provide readers with non-theistic explorations of the metaphysics of God. Each essay is well

written, and the scholarship is fairly solid. However, most of the essays do not offer alternative conceptions to a theistic understanding of God in any significant depth.

For example, Karl Pfeifer's paper, "Pantheism as Panpsychism," spends more time developing panpsychism than it does articulating pantheism. The connection to pantheism is not altogether clear as it seems that a theist could easily adopt panpsychism without endorsing pantheism. Andrei A. Buckareff develops a powerful argument for thinking that God must have spatial location; however, he does not develop this model of God in any depth. He spends the majority of the essay arguing for the conclusion, and no time articulating what that conclusion looks like. The only indication of what this alternative model of God might look like comes in a footnote where Buckareff says that a spatial God could fit either pantheism or panentheism (p. 214). It is not clear to me why a theist cannot say that God is spatially located. In fact, scholars like Robert Pasnau, Ross Inman, and others have argued that no classical theist wished to deny spatiality of God until after the scholastic era. So it is not altogether clear that Buckareff's spatial God is an alternative to theism.

Another set of examples come from Willem B. Drees and Eric Steinhart's contributions to *Alternative Concepts of God*. In Drees' paper, he never fully develops an alternative to theism. In his paper he discusses several issues in science, then gestures towards the view that maybe we do not need a personal God. Instead, Drees thinks we should say that the divine is the ground of existence (pp. 208-210). Drees does not even hint at what this could possibly mean. Theists often say that the personal God is the ground of existence, so the reader is left wondering what alternative concept of God Drees has given us. In Steinhart's paper, he offers an account of religious naturalism. Naturalism is typically taken to be a rival to theism in contemporary philosophical literature. However, Steinhart does not offer definitions of his terms, this includes a definition of "naturalism." So it was not obvious to me how this is an alternative to the concept of God that we find in theism.

To be clear, I am not saying that these are bad essays. I am simply pointing out that they do not give the reader a clear, developed, alternative conception of God to the well-developed versions of theism on offer elsewhere. In fact, in several cases, the essays offer alternatives *to* the concept of God. For instance, J. L. Schellenberg develops an interesting proposal for thinking about the ultimate nature of reality that does not automatically lead to any personal God at all (p. 166). I must emphasize the "automatically" because nothing in Schellenberg's proposal leads us away from the personal God of theism either.

In several of the essays, I struggled to understand the desirability of the alternative conceptions that were proposed. Emily Thomas' essay articulates Samuel Alexander's space-time God. On this proposal, God will eventually emerge from the universe. However, God does not yet exist. God has not yet emerged from the universe (pp. 256-264). Thomas attempts to argue that this conception of God is better than other versions of panentheism on offer by theologians like Philip

Clayton (pp. 264-271). Yet, I failed to see how this was the case. This emergent account of God cannot explain the existence of the universe, nor why we should think that the universe will give rise to a God. On current scientific projections, the universe is headed towards heat death, which makes life in the universe impossible. The needed level of complexity for a God to emerge from the universe will not last for long, assuming the universe ever reaches that level of complexity before heat death obtains. It is not clear to me why this is more desirable than Clayton's personal panentheistic God.

Another example comes from John Bishop and Ken Perszyk's non-personal conception of God. They claim that God is the love between human persons, and try to argue that this conception of God is better than a personal God with attributes like omnipotence and omniscience. In particular, they argue that a personal God makes the problem of evil intractable, whereas their non-personal conception of God can provide a clear account of human salvation from evil. In reply, Marilyn McCord Adams offers a critique of this non-personal conception of God. She argues that she cannot understand what Bishop and Perszyk's proposal really amounts to. She explores several possible interpretations of Bishop and Perszyk's non-personal God, and explains why each interpretation fails. Further, she argues that 'love between human persons' cannot solve any problem of evil, nor save anyone from horrors. I found Adams' argument to be spot on which leaves the reader doubting the desirability of Bishop and Perszyk's alternative concept of God.

For as critical as I am being, I should point out that several essays are worthy of note. Brian Leftow offers an interesting critique of naturalistic versions of pantheism. In one of the arguments he develops he argues that we tend to think that any being that befits the title 'God' is worthy of worship. Part of being worthy of worship is being the kind of object that can be aware of worship directed towards it. Yet, it seems like there is no way that a naturalistic universe could be an object of worship because it lacks awareness of anything (pp. 71-73). Yujin Nagasawa develops an account of panentheism modeled on David Lewis' modal realism. After articulating and motivating the model of God, Nagasawa argues that this model of God makes the problem of evil intractable. Robin Le Poidevin's essay on religious language offers an excellent critique of religious fictionalism arguing that one cannot coherently conceive of God as a fictional object.

To sum up, several of the essays in this volume are well written, and will be important for theologians and philosophers of religion to consider. Students who are thinking about pantheism will greatly benefit from Leftow's essay. Students working on religious language will want to read Le Poidevin's criticism of religious fictionalism. However, if students are looking for well-developed alternatives to theism, they should look elsewhere.

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**Bryson, James, ed. *The Religious Philosophy of Roger Scruton*. New York: Bloomsbury Academic, 2016, pp. 273, \$114.00, hardback.**

In 2016 Roger Scruton, eminent British philosopher and writer, was knighted by Queen Elizabeth on her birthday. Sir Roger, recognized for his accomplishments in philosophy, teaching, and public education, was at the apotheosis of career spanning decades where he wrote and lectured on topics ranging from aesthetics, art, politics, and natural conservation. Surprisingly, there has been very little academic literature about Sir Roger's writings, even less about his religious views. Given that he has written works on both religion and church life, this absence is glaring. It was to a great surprise that I noticed *The Religious Philosophy of Roger Scruton*. Originally conceived as a conference on Scruton's writings, the work is a collection of papers presented on Sir Roger's religious philosophy. The collection is well-thought out and organized clearly.

The book itself is divided into four parts, each with essays devoting their time to exploring various areas of Scruton's work. Part I is an exploration of Scruton's writing on religion, Part II attempts to dive into the influences that shaped Scruton and his writing. Part III explores Scruton's defense of art, beauty, and aesthetic endeavors. Finally, Part IV is a collection of essays analyzing Scruton's conservatism. The work concludes with a final essay from Scruton, responding to several essays from the work.

Each essay analyzes, in varying degree, a key aspect of Scruton's work. One idea that gets a lot of attention in this work is Scruton's concept of *the sacred*. An admittedly vague concept, various authors attempt to demonstrate that this concept is the interpretive center of Scruton's work on religion, aesthetics, and political philosophy. John Cottingham, for example, shows that Scruton wants this concept to have a metaphysical foundation. But, he says, Scruton does not go far enough (41). While it's clear that Scruton has a Judeo-Christian orientation, he will often elide the ethical demands of this framework in favor of an "over-aestheticized, or perhaps over-romanticized analogue for religious awe" (42).

This criticism becomes a key theme throughout the essays contained in this excellent work. The impression left after finishing the work is that many of the scholars are in agreement with the path that Scruton is blazing; they only wished he was clearer about the directions. That is, they wanted *more*. For some, a warmed-over Anglican Protestantism that serves as mere housing of the best of English religion and culture is not enough. As Brian Hebblethwaite comments in his essay, "Metaphysical and Doctrinal Implications," that while Scruton clearly understands the power of Christianity's ideas, his "reluctance to pursue the path of metaphysics makes me wonder how far his commitment to the truth of Christianity goes" (71).

The location of this skepticism is undoubtedly Scruton's clear affinity for Kantian metaphysics. This shows itself throughout his various works. In *Beauty*, for example,

Scruton lands in Kantian disinterestedness as an essential feature of the apprehension of beauty. This avenue is the way in which we can experience the transcendental (or sacred) without knowing *where* it comes from. It is beyond the rational experience, but it comes to us in our aesthetic experience. Aesthetics is the pathway toward the transcendent, and in this he follows the post-Kantian idealists.

Readers of this work will find it to be challenging but rewarding. It is unique in the field as it is—at least in the reviewer’s awareness—the first sustained academic exploration of Roger Scruton’s thoughts on religion. The book itself does not have to be taken in chronologically. Rather, the four parts are nicely divided such that one can dive into the area they feel most comfortable or curious to explore. If you are looking for a place to begin with Roger Scruton, this work would likely not serve you well. Instead, Mark Dooley’s *The Philosopher on Dover Beach* can serve as an excellent appetizer to this work. Dooley presents Scruton’s overall project and ideas. If you are looking to start with Scruton on religion, the reviewer suggests *The Face of God* or *The Soul of the World*. Regardless, gathering a sense of what Scruton means by *the sacred* will be an essential hermeneutical key to unlock the riches the British philosopher has to offer.

In sum, this work is highly recommended for those students that may be interested in Roger Scruton, an example of what it may look like to ride the fence of the proverbial “analytic” and “continental” divide, or for purveyors of philosophy of religion. Further, it would serve evangelical Christians in academics to read this work. A weakness of the work is that it did not advance conversations theologically. Perhaps this is a misplaced grievance. If so, then it presents an opportunity for evangelicals to engage with Scruton’s work in order to see what we may learn from him. While, as a friend once said, Scruton is not regarded among evangelicals as a “brother”, he is a fellow-traveler. A cobelligence between evangelicals and Scruton could prove a boon to the former. We have common enemies, and he can provide helpful ammunition.

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**Taliaferro, Charles and Chad Meister. *Contemporary Philosophical Theology*. New York, NY: Routledge, 2016, pp. 242, \$44.95, paperback.**

The authors are both well-established experts in the fields of philosophy and philosophical theology. Charles Taliaferro, Professor of Philosophy at St. Olaf College, is the author, co-author or editor of over twenty books. Recent books include *The Golden Cord: A Short Book on the Sacred and the Secular* (University of Notre Dame Press, 2012) and *The Image in Mind* (Bloomsbury, 2013, co-authored with Jil Evans). He is the co-editor of *The Routledge Companion to Theism* (Routledge, 2012, with Victoria S. Harrison and Stewart Goetz) and *The Ashgate Companion*

to *Theological Anthropology* (Ashgate, 2016, with Joshua R. Farris). Chad Meister is Professor of Philosophy and Theology at Bethel College. He, too, is the author, co-author or editor of over twenty books. Recent books include *Christian Thought: A Historical Introduction, second edition* (Routledge, 2016, with J. B. Stump) and *Introducing Philosophy of Religion* (Routledge, 2019). He is co-editor of *The Cambridge Companion to the Problem of Evil* (Cambridge University Press, 2017, with Paul Moser) and *God and the Problem of Evil: Five Views* (IVP Academic, 2017, with James K. Dew, Jr.). Together, in *Contemporary Philosophical Theology*, they offer a solid introduction to and defense of philosophical theology.

One valuable feature of the text is the authors' careful analysis of the discipline of philosophical theology. They maintain that "*philosophical theology* involves critical, disciplined reflection on the concept of God or the divine" (p. 2). They note that one may do philosophical theology from the inside, as a member of a religious-philosophical tradition, or from the outside, with a sympathetic understanding of a tradition of which one is not a member. The authors contend that to engage in such reflection, either from the inside or the outside, requires an appreciation for and a sympathetic understanding of various philosophical and theological methodologies. This makes it possible, for instance, for a Christian or Hindu to make valuable contributions to Islamic philosophical theology.

The first few chapters respond to critics who object that science has somehow demonstrated the impossibility of philosophical theology. These chapters alone are worth the price of the book. For instance, chapter one considers the objection that because the methods of philosophical theology cannot be empirically or scientifically tested, discourse on or about God is ungrounded. Critics go on to conclude that only explanations rooted in physics, chemistry, and biology, and the like, are rationally acceptable. But this link of thinking fails, our authors argue, because it assumes the primacy of the methods and practice of science. In short, these critics make a substantive philosophical assumption that begs the question against philosophical theology. Moreover, these 'scientific' critics of philosophical theology tend to overlook the fact that we are much more deeply acquainted with mental realities than we are extra-mental physical realities. A careful study of these chapters shows that the methods and practices of philosophical theology are not necessarily incompatible with the methods of science.

Chapter three covers the topics of pluralism and religious diversity. The authors defend the view that pluralism and religious diversity provide us with an opportunity to encounter and to consider the divine from multiple vantage points. One highlight of this chapter is a discussion of how some critics of reasonable religious belief display unwarranted bias towards miracles and religious belief. Kitcher's case against religious belief, for instance, depends on drawing a stark contrast between religious claims about a transcendent reality and scientific claims about the physical world. He assumes that concepts of physical reality, including the nature of causation,

matter, and physical reality, are philosophically stable and conceptually clear. But, as contemporary physics goes to show, these concepts are rather murky and philosophically problematic.

Chapter four covers reasons and revelations. Here the authors propose that “there are cases when the appearance of divine disclosure counts as evidence that there is disclosure of the divine” (p. 79). In the light of the possibility of divine disclosure, they argue that Hume’s case against rational belief in miracles, when shorn of its loaded language and once we take note of his prejudice against and his misguided assumptions about religion, is rather weak. They go on to propose that theistic arguments have more force once religious experience is considered.

Chapter five is a standard account of divine attributes and chapter six and seven cover the notions of good and bad and the problem of evil as it pertains to philosophical theology. Those new to these issues will find this material helpful. Chapter eight is a philosophical exploration of important theological and religious themes in Judaism, Christianity, Islam, Hinduism, and Buddhism. This chapter covers a lot of ground but does not skimp on details. Highlights include discussions of Hindu notions of karma and reincarnation and Buddhist teachings of no-self (briefly, the view that there is no substantial self) and Nirvana. Chapter nine considers the sort of cultural and educational role that philosophical theology may play in a democratic society.

This book is an excellent introduction to philosophical theology. While tightly argued and sophisticated, it is not overly technical. Those well versed in theology but new to philosophy should not have trouble digesting the main ideas but those doing it for years or decades will find valuable insights. The book is broad in scope and inclusive. It not only covers the Christian tradition, but also considers topics and issues that are unique to Jewish, Islamic, Buddhist, and Hindu traditions. All students of philosophy and theology will benefit from reading this book. Professors will appreciate its pedagogical features. In addition to extensive references, at the end of each chapter are ‘further reflections’ sections designed to stimulate scholarship and discussion. There are plenty of ideas in these pages for paper topics, for students as well as scholars.

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**Schellenberg, John. *The Hiddenness Argument: Philosophy’s New Challenge to Belief in God*. Oxford: Oxford University Press, 2015, pp.xii+142, £25.00, hardback.**

John Schellenberg, Professor of Philosophy at Mount Saint Vincent University (Canada), brought “The Argument from Divine Hiddenness” (*ADH*) into the purview of academic scholarship. This (quite easy) argument goes like this: the Christian tradition depicts the ultimate well-being of human creatures as being dependent on

a loving relationship with God. However, if God exists and is perfectly loving, why does not God make sure that all come to believe in Him? God's hiddenness and the phenomenon of nonbelief seem to count against the very existence of a perfectly loving God. The *hiddenness argument* takes the form of a philosophical argument against theism, and much of this short book is dedicated to strengthening and defending the premises that when joined together entail the conclusion, "God does not exist".

Chapters 1 and 2 establish the philosophical groundwork for Schellenberg's project. He provides the reader with the basic tools, explains the nature and purpose of making an argument, and what "philosophers are up to when they produce what looks like technobabble" (p. 14). He further explains the key term of "hiddenness" and what it means to have a worldview that makes reference to an ultimate reality (ultimism). Chapter 3 seeks to identify the precursors to the hiddenness argument and identify when the "'germ' of the idea of hiddenness did make an appearance" (p. 24). Schellenberg argues that the "most conspicuous examples appear from the seventeenth century on" (p. 24). One historical source is Blaise Pascal who recognized that God's existence is not evident to all. A more recent inspiration for Schellenberg's argument comes from John Hick who argued that reality is religiously ambiguous and open to both theistic and non-theistic interpretations.

Chapter 4 establishes the main premise: "If a perfectly loving God exists, then there exists a God who is always open to a personal relationship with any finite person" (p. 38). Moreover, given God's omnipotence, the universe would be designed in such a way that nothing "puts relationship with God out of reach for finite persons" (p. 41). The sceptic could retort and say that nonbelief is a result of some people resisting God. Chapters 5 and 6 address the issue of non-resistant nonbelief, and they make the argument that "we find plenty of clear examples of *non-resistant nonbelief*" in prehistoric hunter-gatherer societies (p. 77). That is, people who through no fault of their own did not believe in God. Nowadays, due to increasing secularity, there are people who go about their lives without entertaining the existence of God because of particular cultural and social circumstances. This is another case of non-resistant nonbelief, according to Schellenberg.

Chapter 7 addresses another possible objection that would counter the first premise, namely that God is *not* all-loving. I agree with Schellenberg that a "God that's less than ultimate would not be" worthy of worship (p. 91). Moreover, we assume that it is intrinsically valuable for a parent to love a child, and it seems as if a similar "parent-child relation exists between God and finite persons" (p. 99). Chapter 8 rounds off the book with Schellenberg answering some more possible objections.

There are at least two possible approaches to respond to *ADH*. One could question the logical validity of the argument, by arguing that the conclusion, "God does not exist," does not follow from the premises. Or, one could theologically attempt to identify some greater good that would be secured if God remained hidden. It is interesting, and problematic, that Schellenberg quickly rules out this second

approach. A common thread throughout the book is Schellenberg's resistance to allow theological explanations for God being hidden to enter into the picture. As he writes, "you are required to take all such preaching with a grain of salt and keep our eye on the evidence" (p. 81). To do this, he notes, might "be difficult for someone who believes in God . . . but it's exactly what's required to assess the hiddenness argument *philosophically*" (p. 64). I think that this attempt at closing off theology from offering solutions to the problem of hiddenness is unsuccessful and question begging. Schellenberg asks us to privilege philosophy, but I see no *philosophical reasons* for excluding theological explanations for God's perceived hiddenness. This is not to say that theological reasons always trump philosophical ones, but that they should be brought into engagement with each other.

One core idea within Schellenberg's argument is that the relationship between God and human persons is similar to that of a parent and his/her child. To some extent this is true, and Christian Scripture contains passages that affirm such a view. The idea is that God, like an idealized parent, would always want to be in a loving relationship with his children. More so according to Schellenberg, God being all-powerful and omniscient would be able to accomplish this. Yet, appealing to God's supreme nature has a flipside. It could be argued that God has reasons, which exceed human understanding, for refraining from obtaining divine-human relationships in order to secure something intrinsically good. This greater good, however, might not be *our* greater good. It could further be argued that divine silence, manifested in perceived hiddenness, might be an expression of God's preferred mode of interaction with human beings. This view has been explored by Michael Rea.<sup>1</sup> One could also seek to justify the existence of some forms of non-resistant nonbelief by appealing to divine humility. This has been suggested by Travis Dumsday.<sup>2</sup> Needless to say, there are multiple theological avenues available for approaching *ADH*. My main point is that it should be permissible to appeal to theological solutions within this discussion, and that philosophical methodology should not come at the expense constructive theology.

*The Hiddenness Argument* is written in a way that makes it accessible to the general public. Schellenberg equips the reader with the necessary philosophical tools, and he puts forward the argument in a systematic and pedagogical manner. He wants to avoid philosophical "technobabble" and he achieves this task. This is an important and foundational contribution to current research on God's hiddenness, and it will continue to provoke reactions among theologians and philosophers.

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1. See Michael C. Rea, "Divine Hiddenness, Divine Silence," in *Philosophy of Religion: An Anthology*, ed. Louis P. Pojman and Michael C. Rea, 6th edition (Wadsworth: Cengage Learning, 2011), 266-75.

2. Travis Dumsday, "Divine Hiddenness and Divine Humility," *Sophia: Journal of Philosophy and Traditions*, vol.53 (2014):51-65.



**Jaworski, William. *Structure and the Metaphysics of Mind: How Hylomorphism Solves the Mind-Body Problem*. New York: Oxford University Press, 2016, pp. 362, \$85.00, hardcover.**

William Jaworski advances a unique take on an ancient metaphysical notion to solve the most confounding problems in the Philosophy of Mind. In *Structure and the Metaphysics of Mind: How Hylomorphism Solves the Mind-Body Problem*, Jaworski's modest aim is to "...show that hylomorphism deserves a place at the table alongside more familiar theories such as nonreductive physicalism, emergentism, and Russellian monism" (p. 314). This goal is achieved.

The first five chapters of the text may be taxing for the beginner scholar, as they focus on metaphysically abstract questions like the problem of universals, the nature of structure, powers, and puzzling questions in mereology. Nonetheless, the payoff in the subsequent chapters is a lucid and original hylomorphic theory of mind which can provide compelling responses to a wide variety of problems physicalist theories of mind face.

Hylomorphism, for the uninitiated, is the position that among the basic constituents of reality are matter (ὕλη) and form (μορφή), or as Jaworski prefers, structure. Jaworski argues that, "A worldview that rejects hylomorphic structure... is a worldview that lacks a basic principle which distinguishes the parts of the physical universe that can think, feel, and perceive from those that can't..." (p. 2). His mantra throughout the book is that *structure matters*, i.e. it is an irreducible ontological principle that, at least in part, accounts for what things essentially are; *structure makes a difference*, i.e. it operates as an explanatory principle that accounts, at least in part, for the powers things have; and *structure counts*, i.e. it explains the unity and persistence of composite individuals in a dynamic world (p. 3).

Among the important feature of Jaworski's metaphysical framework for his hylomorphism is a substance-attribute ontology combined with a view of properties as sparse, rather than abundant, where properties would be co-extensive with predicate or class terms. That is, substances and the properties they have are individual and properties are "...what explain the objective similarities and differences among individuals and the causal powers they have" (p. 30). He affirms the "Eleatic Principle", in which one is only ontologically committed to that which plays a causal role (p. 30). Jaworski defends properties as tropes, e.g. a shade of red in one apple may exactly resemble a shade of red in another apple, but there is not some universal property which is the same across these two different individual apples. Jaworski's trope theory is pertinent to his brand of hylomorphism, e.g. his account of identity conditions for powers and activity-making structures utilizes the exact similarity among individuals (see p. 60 and p. 158). It is worth noting that while Jaworski rejects properties as universals, he says that his theory is compatible

with those who accept universals, commending E. J. Lowe's realism of universals as an example (p. 52).

Structure is what brings unity to parts and so is pertinent to the metaphysics of mereology. Jaworski utilizes Peter van Inwagen's views on composition, in which there are only physically simple things and biological or living composites, as a foil to compare and contrast his hylomorphic views on mereology. Several well-known metaphysical problems in mereology, some of which arise for van Inwagen, are disarmed by Jaworski's hylomorphism. Such problems include the body-minus problem, the problem of too many thinkers, the atomless gunk objection, and the supposed absurdity of van Inwagen's denial of composite objects common to our experience, e.g. tables and mountains.

Part of Jaworski's account includes activity making-structures, noting that the hylomorphist is not merely committed to there being individual-making structures but also those which matter, count, and make a difference. Activity-making structures are significant in understanding how hylomorphism applies to the philosophy of mind, as mental activities are paradigmatic examples, e.g. thinking, feeling, and perceiving. Notably, Jaworski argues in favor of an embodiment thesis, i.e. that "...all of the powers of structured individuals are essentially embodied..." (p. 162). To make his case, Jaworski notes that the burden is on his detractors to establish that there are any unembodied aspects to structured individuals. He considers some of Aristotle's arguments for the immateriality of mind (*νοῦς*) found in *De Anima* 3.4, delving into an analysis of Aristotle's analogy between perception and intellection. However, having embraced the embodiment thesis, Jaworski infers that the hylomorphist is committed to structo-physical necessitation and supervenience, which support the worry once raised by Bernard Williams that hylomorphism is just a polite form of physicalism.

To understand this worry, it is necessary to define "Physicalism", but this is notoriously difficult. Jaworski cites Carl Hempel's famous dilemma that if we are to define physicalism as the theory that everything can be exhaustively explained by physics, then either we are referring to contemporary physics, or some future ideal physics. If it is the former, physicalism is almost certainly false, since our current physics will undoubtedly be revised, and if it is the latter, than physicalism is contentless, as we don't know what this ideal physics will be. Nonetheless, Jaworski opts for a definition in which physicalism is supposed to exhaustively describe and explain everything, "...by the most empirically adequate theories in current or future physics," a definition that would include nonreductive physicalists who implicitly are committed to property dualism (p. 224). Interpreting Williams' worry nine different ways, Jaworski carefully positions his brand of hylomorphism as a non-physicalist theory that takes structure as fundamental, and in so doing, he resists the notion that everything, and in particular mind, could be exhaustively explained by physics. While

every argument cannot be rehashed in this review, a couple of critical comments are worth mentioning.

Jaworski raises the concern that hylomorphists believe thought, feeling, and perceptions, "...are composed of the structured manifestations of the powers of lower-level things, their powers and manifestations, are typically revealed through functional analysis" (p. 254). This suggests that the hylomorphist expects a material solution to what David Chalmers describes as the hard problem of consciousness. This worry hinges on the premise that reductive explanations imply that higher-level phenomena logically supervene on lower-level phenomena, and logical supervenience implies 'materialism', i.e. "physicalism". Jaworski cites Chalmers' definition of "materialism", which Chalmers takes to be synonymous with "physicalism"; the notion that there is nothing over and above the physical, and that materialism means that all the positive facts about the world are globally logically supervenient on the physical facts" (pp. 255-6). Jaworski rejects the supervenience-based definition of physicalism as not capturing the core physical thesis that everything can be exhaustively explained via physics (see §11.5-11.6). Jaworski may be quibbling with Chalmers over how "physicalism" is to be defined. However, a deeper issue is whether a reductive explanation like a functional analysis can provide an exhaustive explanation. Chalmers thinks that reductive explanations should remove mystery, while Jaworski argues that the hylomorphist need not think that lower level mechanistic explanations remove all mystery, but need only answer how-questions. Moreover, the hylomorphist may escape the charge of physicalism in that she can accommodate causal-explanatory pluralism, in which some explanations are not reducible to the level of physics. Still, citing what a hylomorphist can accommodate or her lack of commitments, seems, at best, to show that hylomorphism can be a form of non-physicalism, but may incidentally be a form of physicalism, if it turns out that functional-analysis is mystery removing. Jaworski points out that a hylomorphist will view a mechanistic explanation as "...postulat[ing] components that contribute teleologically to an activity as a whole", which suggests a stronger stance on causal and explanatory pluralism (p. 256). Still this point is a bit soft-pedaled. The hylomorphist must not merely accommodate explanations and causes that go beyond the "how-questions", the hylomorphist must insist that such explanations or causes exist.

As thorough as the book is with respect to physicalism, little space is dedicated to responding to those who would reject the embodiment thesis. While Aristotle's arguments are addressed, his account of *voûç* is famously abstruse and his theory of perception is antiquated. There are, however, contemporary hylomorphists who reject the embodiment thesis, e.g. James F. Ross and David Oderberg. I would have been interested to see how Jaworski would parry James F. Ross' argument that determinate thought processes require an immaterial aspect to the mind (J. F. Ross. "Immaterial Aspects of Thought." *The Journal of Philosophy* Vol. 89 No. 3 [1992]: pp. 136-155)

or Oderberg's argument from the problem of storing concepts (D. S. Oderberg. *Real Essentialism*. New York: Routledge, 2007, p. 252.).

One can only surmise how, given Jaworski's metaphysics, he would respond to contemporary detractors of the embodiment thesis. Nonetheless, this does not diminish a successful undertaking. He dedicates his book proportionately to the trends one finds within contemporary philosophy of mind, a task that is necessary if he is to make the case that hylomorphism deserves a place at the table. Lastly, I should say the book is well-produced, lucid, organized with a clear structure, and free of typographical errors. *Structure and the Metaphysics of Mind* deserves a place on the desk of any philosopher of mind.

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***The Ashgate Research Companion to Theological Anthropology*. Edited by Joshua R. Farris and Charles Taliaferro. Burlington, Vt.: Ashgate Publishing, 2015. xx + 404 pp. \$149.95.**

Anthropology is among the more complex disciplines in Christian theology. Part of what makes this discipline so complex has more to do with how one conceives of the questions—both in terms of starting points and assumptions—than it does with where one finds the answers to them. Remarkably serviceable to advanced graduate students and scholars alike, *The Ashgate Research Companion to Theological Anthropology* is certainly the place to start for those who want to come to terms with both the questions and answers that concern human constitution, evolutionary biology, the image of God, cognitive neuroscience, human freedom (and much more) as it relates to Christian theology.

Boasting a total of twenty-seven chapters, plus the introduction, the *Companion* is divided up into seven main sections: 1) Methodology in Theological Anthropology; 2) Theological Anthropology, The Brain, The Body, and the Sciences; 3) Models for Theological Anthropology; 4) Theological Models of the Imago Dei; 5) Human Nature, Freedom and Salvation; 6) Human Beings in Sin and Salvation; 7) Christological Theological Anthropology. A fairly balanced ratio of chapters to sections displays the thoughtful labor of two discerning editors, who from all appearances have rightly anticipated the broader scope of their reader's interests. This is particularly true for those interested in more commonly controversial subject areas in the Christian tradition. The contributors too are as diverse as is the content of their essays; a good mix of theologians and philosophers, both junior and senior scholars, and Roman Catholic, Protestant, and Eastern Orthodox thinkers. The introduction is a relatively brief and yet, quite useful state of the art, reading more like an invitation to keep reading than anything else. In short, *The Ashgate Research Companion to Theological Anthropology* bears all the marks that a good research companion should. In order

to make this assertion more measurable, let us consider a sampling of three of its chapters in some more detail.

Consider first, Marc Cortez's thought-provoking chapter, 'The Madness in Our Method: Christology as a Necessary Starting Point for Theological Anthropology' (pp. 15-26). As the inaugural chapter of the *Companion*, Cortez's well-researched, carefully-crafted argument in some ways set the tempo, so to speak, for what readers ought to expect from the remaining essays. In short, Cortez argues that our understanding of Christ's humanity as 'true humanity' ought to be archetypal for our understanding the nature of the remainder of humanity. Cortez's Barthian-inspired case is complimented by John Cooper's essay, 'Scripture and Philosophy on the Unity of the Body and Soul: An Integrative Method for Theological Anthropology' (pp. 27-44), which offers an alternative thesis to that of Cortez. Cooper argues, roughly, that Christians ought to weigh contemporary (and historic) models of anthropology against "what the Scripture teaches about the unity of the body and the soul" in order to achieve what he calls "a comprehensive theological anthropology" (p. 27). Orbiting mainly around a discussion of the soul-body relationship in the afterlife, and offering what ends up being a (helpful) macro picture of the status of the debate in contemporary theology about which comes first, Scripture, philosophy, or science in determining our theological anthropology, the take away from Cooper's essay is mostly a subjective assertion that while debate continues, our litmus test for determining the best model of anthropology ought to be the Christian Scriptures. Cortez's approach is by no means different than Cooper's on this point. Cortez simply takes Cooper's assertion a step further, namely, by grounding a scripturally faithful anthropology in our Christology. Cortez goes on to defend this thesis by an appeal to Barth, whom he quotes as saying, "'The nature of the man Jesus alone is the key to the problem of human nature'" (p. 19). This is certainly controversial (particularly in light of Cooper's argument). I am admittedly a bit suspicious of mounting an argument for this or that account of human nature purely from the Scriptures, which as far I see things at this point, does not offer much of detailed prescription for (so much as a description of) how we ought to account for the nature of humanity. That said, Cortez's treatment of Barth is more than fair and for this reason, persuasive, at one point drawing attention to the care that ought to be taken in not mistaking Barth's method as anything more than a "scientific study of the 'phenomena of the human'" (p. 24). Invoking these Barthian concerns almost as a subtle warning to contemporary theologians who run considerable risks of reading far too much onto the humanity of Christ by beginning with "non-theological interpretations" of humanity at large, Cortez's final challenge to readers comes down to this: 'how self-consciously and honestly systematic is your theology?' In other words—taking a cue from Barth—developing a coherent theological anthropology cannot ignore other theological loci.

Next, consider, Ben Blackwell and Kris Miller's chapter, 'Theosis and Theological Anthropology' (pp. 303-317). This essay covers an enormous amount of

ground—biblical data (i.e., 2 Peter 1.4; Colossians 2.9-10), Patristic theology (i.e., Maximus the Confessor), and Modern theology (i.e., Tom Torrance)—in short but careful order. More than a helpful lesson in how one might ‘bring the ancient and modern’ (p. 303) discussions of human participation together, Blackwell and Miller make a convincing case for “the priority of a relational ontology for understanding theological anthropology” (p. 315). And playing off of his recent and insightful work (*Christosis: Pauline Soteriology in Light of Deification in Irenaeus and Cyril of Alexandria* [WUNT 2/314; Tübingen: Mohr Siebeck, 2011]), Blackwell and Miller paint a helpful picture of the development of soter-theotic thinking in their treatment of Maximus. Here, they deploy Blackwell’s distinction between what he (in his monograph) calls “attributive deification” (“[becoming] God by grace”) and “essential deification” (“[becoming] God by essence”), arguing both for Maximus’ commitment to the former and as a result of his Christological conviction that in the incarnation Christ assumed all (elect) humanity to himself, Maximus’ commitment to some sort of eschatological and “unconfused union” of God and “restored” humanity (pp. 307-8). With this, Blackwell and Miller jump ahead from the seventh to the twentieth century and Torrance’s doctrine of “participation” (p. 309). The author’s take care to faithfully represent Torrance as they did Maximus, coming largely to the same conclusion that for Torrance “human participation is not by nature but by grace” (p. 310). They argue that, “Torrance’s notion of participation is thoroughly Trinitarian. For Torrance, humans are adapted for union, communion, and participation in God through and by the Spirit without losing our humanity” (p. 313). While Maximus provides the basis for their initial conclusions, namely, that Christian soteriology amounts to some sort of theosis, it is upon Torrance’s Trinitarian conclusions that Blackwell and Miller ultimately make much of their case for “the priority of relational ontology for understanding theological anthropology” (p. 315). In the end, their account of relational ontology is more roughed out than finished, going something like this: humanity is designed for (because we reflect) Trinitarian union; humanity is then created for union; the fall corrupts this union; Christ’s redemption re-inaugurates this union; both the divine impulse for union and the nature of divine union itself ought to inform how we understand soul-body relations. Their conclusion, that “the doctrine of theosis draws anthropological discussions back to the theocentric intention for humanity, redemption as union and participation, and a relationship ontology”, is reflective of both Cooper and Cortez’s sentiment that our exploration of such highly nuanced issues in theological anthropology will necessarily be ongoing (p. 317).

Finally, let us consider John Chan’s ‘A Cartesian Approach to the Incarnation’ (pp. 355-67), and what he says is his “modest” attempt to “consider the possibility of an orthodox doctrine of the incarnation with the presupposition of Cartesian dualism” (p. 355). Chan’s piece exemplifies what I think is some of the best of what this Companion offers—rigor, careful research, and good ol’ constructive philosophical-theology. Certainly less methodological in his approach than Cortez



and less historical-theological than Blackwell and Miller, Chan's piece is equal parts theology and metaphysics; or, better still, a piece of Analytic Theology. Chan's project involves a few important moves, the first of which is a helpful disambiguation of what a Cartesian account of substance dualism looks like in comparison to other accounts of substance dualism that have dominated the bulk of the Christian tradition. On a Cartesian model of substance dualism, Chan carefully argues that personhood is identical to the soul—the body thus being purely contingent. He says that, "according to Cartesian Dualism (CD), embodiment is a contingent state of affairs—the minimum requirement for personhood is being identical to a soul; being 'attached' to a particular hunk of matter is not necessary" (p. 356). For those familiar with the constituents of Chalcedonian orthodoxy, Chan's next move is not hard to anticipate as he traces out some of what is at stake for the worries that lie between the Docetic and Nestorian heresies. Interacting with Oliver Crisp's account of the virgin conception of the God-man, Chan exposes some of the liabilities of relational views of the soul, particularly as it pertains to the causal origins of the human body and soul of the humanity of Jesus. Upon this foundation, Chan makes his final move, namely, a defense for the so-called "abstract nature model" (that the Son assumes a set of properties, necessary and sufficient for human nature) of the incarnation, which he says is a way to elide problems that necessarily stem from "concrete nature models" (that the Son unites himself to a concrete particular, yielding what is sometimes called a three-part compositional Christology); the worry, of course, being that "a Cartesian soul is a person simpliciter and in a concrete nature incarnation, the Word assumes a human nature in virtue of Cartesian soul. In so doing, he takes on a distinct person on both simpliciter and relational versions of Cartesian dualism" (p. 367). Chan, like the other contributors that we've considered to this point leaves the reader thinking about the potentials for further research, by pointing to several hurdles that his abstract nature Cartesianism has yet to overcome.

From a low and slow flyover, as it were, there is little to criticize about this volume—its contributors represent some of the brightest minds in the field and their contributions cover some serious ground in four-hundred pages. From thirty-five thousand feet, however, this Companion lacks one signal, though, less-than-obvious feature. Not one chapter deals exclusively with how an idealist metaphysic makes sense of human nature. While idealism is certainly mentioned in several chapters as a still viable, though significantly under-appreciated account of human nature (most of which feature in Cortez's other chapter in the *Companion* 'The Human Person as a Communicative Event: Jonathan Edwards on the Mind/Body Relationship'), it otherwise makes little sustained appearance in the volume. Farris, of course, is not unconscious of this fact, having both edited and contributed to the first volume in the Bloomsbury series, *Idealism and Christianity*. That so little attention is paid to idealism is at best, a minor flaw, especially given the current state of interest in the subject.

Finally, as has become my habit, let me say a few words about the physical appearance of the volume itself. Ashgate (recently absorbed by Taylor and Francis) has had a reputation for producing high quality volumes—hat's off to the printers! This volume is a prime example. There is something to be said for durability in the world of \$100+ books these days, and this volume has it. No doubt, what Ashgate had in mind in terms of how useful this volume will henceforth be is anticipated by how well it has been constructed; tightly bound, glossy finish, quality paper, clear and readable fonts, and ample margins for note-taking. Certainly its most striking feature of my hardback copy is its wonderfully eye-catching cover art (John Climacus', *The Ladder of Divine Ascent*)—a think-piece in and of itself. Finally, let me say that publishing often moves at near glacial speeds. But for all who anticipated Farris and Taliferro's *The Ashgate Research Companion to Theological Anthropology*, it was well worth the wait.

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**Joshua R. Farris and S. Mark Hamilton (eds.). *Idealism and Christian Theology*. London: Bloomsbury Academic, 2016, pp. 256, \$100, hardback.**

**Steven Cowan and James Spiegel (eds.). *Idealism and Christian Philosophy*. London: Bloomsbury Academic, 2016, pp. 224, \$100, hardback.**

What does idealism have to do with Christianity? In Bloomsbury's two-volume series, editors Joshua Farris, Mark Hamilton, Steven Cowan, and James Spiegel set out to answer this question. Reflection upon Edwardsean and Berkeleyan idealism has lead them to advocate for a reevaluation of idealism's compatibility with Christian theology. Together they have assembled a wide array of scholars whose personal commitment to idealism varies, but nevertheless each endorses a particular virtue of idealism.

Since space forbids a detailed interaction with each chapter of this series, I have instead opted for a thematic summary and a meta-criticism concerning the enterprise of Christian idealism. The summary might also serve as a recommended reading plan of the two volumes, reorganized according to what I take to be the major contribution from each author. Many of these chapters do a refreshingly excellent job of writing historically informed analytic theology or philosophy, which was a chief aim of the editors of volume one. Consequently, my classification of *prolegomena*, historical theology, systematic theology, and philosophy does not always reflect the genre intention of the authors. My hope is that this review will serve potential readers by

helping them enter into Christian idealism by connecting the unique insights from 'Idealism and Christianity' with the potential interests of future readers.

*Prolegomena*: For those who are novices with the subject of idealism in general, I recommend beginning with Cowan and Spiegel's introduction. Here the editors lucidly and succinctly lay out the essential thesis of Berkeleyan idealism: *esse est percipi aut percipere* or "to be is to be perceived or to be a perceiver" (II.intro). On the other hand, Farris and Hamilton's introduction adds the exotic thinking of Edwardsean idealism alongside a series of questions that commends the relevance of these two modern minds, Berkeley and Edwards, for knotty theological issues today (I.intro). Both introductions have exhaustive chapter previews that should be reviewed by those who wish to have a more detailed summary than what can be provided here. Finally, Spiegel's chapter (II.1) on the idealism and reasonableness of theistic belief shows how the former enhances the latter by looking at some of Berkeley's apologetic contributions. Unlike much of the analytic philosophy genre today, these *prolegomena* essays are accessible and assume no prior knowledge on the part of the reader.

*Historical theology*: Because contemporary monism often comes packaged in a materialistic box rather than an idealist box, Christians have rightly been wary of considering idealism as a plausible metaphysic scheme. Many of the historical chapters in this series argue that while this concern might be legitimate for non-theistic philosophers, the commitments of George Berkeley and Jonathan Edwards are much more complex and faithful to Christian theology. Some of these chapters defend the orthodoxy of Berkeley's doctrine of creation (Spiegel, I.1) and Edwards's Christology (Crisp, I.8 and Tan, I.9). Crisp and Tan's essays represent the only competing perspectives in this series, and their differences could be made more explicit. However, if readers want more from that discussion, they should consult Crisp's *Jonathan Edwards on God and Creation* and Tan's *Fullness Received and Returned: Trinity and Participation in Jonathan Edwards* with an eye towards the importance that dispositional ontology plays in the interpretation of Edwards's idealism. William Wainwright shows readers that Christian idealism lends itself to many creative variations by comparing the account of knowledge of God in Berkeley and Edwards and putting forward philosophical nuances that might otherwise be missed. (I.2) While Keith Yandell's chapter also defends a Berkeleyan account of creation (I.4), his primary contribution to the volume is historical; he places the Anglican divine in the context of the atheistic thinkers of the 17th century, which sheds light on why Berkeley made the philosophical moves he did. The same virtue is present in Timo Airaksinen's chapter on Berkeley's ethics (I.11), whose moral philosophy was meant to curb the spread of unbelief while also providing a path to godly happiness.

*Systematic theology*: Most of the chapters between these two volumes offer immediate resources to contemporary systematic theology, albeit remaining

heavily indebted to both Edwards and Berkeley. Benjamin Arbour's chapter, "God, Idealism, and Time," is one of the most demanding arguments to follow, but it rewards the reader by bringing idealism right into present-day debates in analytic theology regarding God's relationship to time (II.7). In keeping with the significant consequences that idealism has for the Creator-creature distinction, two essays reevaluate popular suspicions surrounding idealistic panentheism. Jordan Wessling provides an Edwards-styled defense (I.3) and Adam Groza adds a Berkeleyan defense (II.6) in which a "weak" mode of panentheism is rendered consistent with Christian orthodoxy. Several other essays address or construct what might be called "idealist anthropology" by replacing substance-dualism with theological monism (Farris I.5) or by replacing the primacy of the material world with that of the mind (Taliaferro II.5). Mark Hamilton pushes some of these conclusions further up field by showing how the simplicity of metaphysical idealism can better account for sin's corrupting effects upon the body than the traditional Reformed approach (I.6). Although Marc Cortez's chapter is primarily dedicated to spelling out the implications of Edwards's immaterialism for the resurrection, it overlaps with these anthropological discussions quite a bit as well (I.7).

There are also a number of worthwhile integrations of idealism into other doctrines. James Arcadi makes a creative and novel case for an idealist account of the Eucharist (I.10). Mark Hight writes what, for many, will be a controversial take on miracles within idealistic parameters, warranting consideration even if it does not represent Berkeley's own opinions (II.9). Lastly, Keith Ward contends that idealism's priority of the mind helps ground the moral life (II.10). Each of these articles is uniquely creative and offers a fresh look at old issues.

*Philosophy:* While every chapter is philosophically informed, there are three essays in particular that are noteworthy for their interaction with non-theistic philosophy. Gregory Trickett, for example, deals with Bertrand Russell's rejection of Berkeleyan idealism by showing how theism can uphold a realist (and correspondence) theory of truth (II.2). His essay might serve future discussions about how Christian idealism can ward off charges of anti-realism. At the end of Howard Robinson's "Idealism and Perception: Why Berkeleyan Idealism is Not as Counterintuitive as it Seems," idealism is provocatively suggested to provide a better ontological fit with current quantum theory than the supposed "common sense" of scientific realism (II.4). Douglas Blount's use of Thomas Kuhn in his chapter on science is also an ambitious employment of idealism (II.8), which I will say more about below, along with Steven Cowan's excellent explanation of idealism and particulars (II.3).

Before moving on to constructive criticism, the contributors are to be commended for the corrective they offer to many mistaken notions about idealism, which is a great service to Berkeley's legacy. Additionally, a great deal of complexity is showcased regarding the types of idealism that are viable for Christians. Since no monolithic scheme dominates the book (e.g. Edwards's occasionalism and theological

determinism are not shared by Berkeley), it should encourage further creativity. Moreover, there is a rhythmic unity to many of these arguments that proceeds from (1) the exposition of a dilemma that realism or “matterism” fails to solve to (2) an elaboration of how idealism relates to the aforementioned dilemma more cogently to finally, (3) the exchange of matter or substance with the divine or human mind as a theoretical explanation. Obviously this type of argument prizes parsimony or simplicity since almost every case involves a removal of some middle substance between God and creation. Furthermore, the immediacy with which idealists place agents (both God and humans) in proximity to their causes appears to require a high view of Providence, which will lead to correlated concerns about the problem of evil or the authorship of sin. Many authors acknowledge this point, rebutting potential concerns with a “no-worse-off” defense, which involves a demonstration of how objections to pantheism from the problem of evil are “no-worse-off” than traditional theistic defenses. Whether or not parsimony and the “no-worse-off” defense are theological virtues will depend upon the convictions of the reader, but since they appear to be inherent within Christian idealism, it would be prudent to explore their value in greater detail.

My meta-criticism for the project of Christian idealism is twofold – part metaphysics and part historiography. The first part is that the editors and some of the contributors undersell their claims, likely out of respect for the reader and a desire to avoid a dogmatic tone. Nevertheless, ontology (defined as the study of reality) is a comprehensive field with major implications for every theological and philosophical issue addressed in these volumes. Consequently, the “mere suggesting,” “worth considering,” the “elasticity and adaptability... [and] the appeal” of idealism (I.intro), and other similar idioms understate the commitment the reader must make when switching their understanding of ontology from, say, Common Sense Realism to Berkeleyan idealism. If one pictures theology as a web of interrelated beliefs, ontology is a strand that upholds the center spiral and every successive thread. One cannot, for example, be a *consistent* idealist with regards to the Eucharist and a substance realist with regards to creation. So while the tone of each contributor is appreciated, the stakes of their recommendations are often much higher than they set.

The second criticism is primarily a question of historiography: why did Berkeley – and to a lesser extent, Edwards – fade from the consciousness of Western philosophy? Why did their influence not persist? Unfortunately, despite the frequent laments by authors in these volumes, this important background question is not explored in any great detail. One would think that if an apparently worthwhile philosophical system ceased to be considered, it would be important to locate the cause of its extinction. Now, I am not suggesting that the meager legacy of modern Anglophone idealism *ipso facto* demonstrates its falsity; rather I am requesting that some explanation be given for this lamentable phenomenon in order to ensure that better ontologies did not come along and replace Berkeley. Fredrick Copleston’s story – representing perhaps the

majority report – is relatively straightforward: Berkeley’s metaphysical philosophy was neglected while his empirical elements, especially his phenomenalist analysis, were picked up and taken in a more skeptical direction by Hume. Hume in turn connects us to the second, more famous half of the story in which he interrupts Kant’s dogmatic slumber, sending Kant in a completely different direction in speculative philosophy – namely into *transcendental* idealism. This Kantian variation of idealism became immensely popular and produced scores of Continental offspring that have come back around to deeply influence the commitments of Anglophone theologians. Readers who wish to look into this more would do well to consult Garry Dorrien’s magnificent work, *Kantian Reason and Hegelian Spirit: The Idealistic Logic of Modern Theology*, which is now the authoritative treatment of the legacy Kantian transcendental idealism. German idealism has so overshadowed its English counterpart that only in 2011 was the first historical survey on the subject ever written (by W. J. Meander: *British Idealism: A History*.) In short, in terms of legacy, Kant dwarfs Berkeley and Christian idealists ought to ask why this is so.

But, one might object, why should a group of Christian analytic theologians and philosophers be concerned with the waxing and waning of historical preferences when the good bishop himself reminds us that “[t]ruth is the cry of all, but the game of a few” (*Siris* 368)? The short answer: some arguments made by Kant and other moderns need to be answered by Christian idealists, and this is especially relevant to Cowan and Blount’s essays. In the *Critique of Pure Reason*, Kant writes that Berkeley’s “dogmatic idealism... declares space, together with all the things to which it is attached as an inseparable condition, to be something that is impossible in itself, and... therefore declares things in space to be merely imaginary” (*KrV* B274). Kant says that Berkeley’s unintended conclusion is unavoidable because he “regards space as a property that is to pertain to the things in themselves; for then it, along with everything for which it serves as a condition, is a non-entity” before going on to state that he has already undermined this type of idealism in the *Transcendental Aesthetic* (*Ibid.*). Cowan touches upon the role that space plays in distinguishing objects only tangentially when he considers the problem of bundle theory, but he gives no constructive account of space from the Berkeleyan perspective. Kant might press Cowan (and Berkeley) on this point, by asking whether or not space (and time) was a property bundled to sensible objects that we perceive rather than an *a priori* form of intuition. If the bundle theory of sensible objects is true, must a Berkeleyan regard space and time as properties of that object, empirically derived? If so, what does this account look like? The issue here is over how the mind determines the character of experience and whether the mind brings space and time, so to speak, to the discernment of objects or if those are attributes derived empirically. For those who wish to pursue this further, I recommend Ralph C. S. Walker’s chapter, ‘Idealism: Kant and Berkeley’ in *Essays on Berkeley*.



Elsewhere in the *Prolegomena to any future metaphysics that will be able to come forward as science*, Kant again objects to Berkeley's supposition that the *noumenal* – things-in-themselves – realm can be knowable from the divine Mind to the human mind through a type of intuitive notion. Berkeley's notional knowledge was not empirical, and therefore it transgressed the categories necessary for the type of science that Kant wanted to uphold. Blount's chapter does not relate as directly on Kant's objections as Cowan's does, but it is the place where the most extrapolation needs to happen. If Berkeley's phenomenalist account of the sciences is right and (especially if occasionalism is true) scientists are actually studying patterns of God's action rather than "so-called natural laws," then both science and theology must undergo major revisions in light of this ontology. Science will have to pull up its realist foundations and scale back its sphere of claims while theology begins to move in and renovate science. Kant would vehemently object to this for a number of reasons, and Christian idealists should think about what they are committing to if such relationship between science and idealism goes forward. Nonetheless I am anxious to see more interaction between the philosophy of science and Christian idealism in the future.

The 'Idealism and Christianity' series is the first of its kind, an inauguration of a rich conversation in metaphysics that manages to be coherent, insightful, and accessible to students and professors alike. At the present moment, accessibility seems to be the most pressing attribute. Many of the questions and conversations at the *Idealism and Christian Philosophy* book panel of the 2016 ETS annual meeting revealed that the primary obstacle to a renaissance of Christian idealism were caricatures or truncated versions of Berkeleyanism. A step towards correcting this situation would be to encourage interested metaphysicians, students, and theologians to obtain these volumes by Bloomsbury while also procuring the works of Berkeley and Edwards. Reading the primary sources of these modern idealists will circumvent many of the problems that appear in secondary literature or in the writings of poor historians of philosophy who act as *de facto* gatekeepers. In the meantime, readers should also be on the lookout for similar volumes on idealism from these authors in the future.

So what does idealism have to do with Christianity? Currently among the evangelical academy, the answer is very little. These volumes take a step in the right direction towards rectifying this problem.

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**Wiseman, Harris. *The Myth of the Moral Brain: The Limits of Moral Enhancement*. Cambridge: MIT Press, 2016, pp. 337, \$38, hardback.**

Are the choices that human beings make and the lives they live determined merely by the chemistry of their brains? For the modern man, has "the Devil made me do

it” given way to “my brain made me do it”? Is the solution for the problem of evil found in neuroscience, in the anatomy and chemistry of “the Moral Brain” (p. 4)? In responding to these kinds of questions, Harris Wiseman, PhD from the Faculty of Divinity at the University of Cambridge and Honorary Senior Research Associate at the Institute of Education in the University College London, seeks to balance legitimate biological accounts of moral functioning with considerations gleaned from philosophy, science, theology, and the field of mental health (pp. 16-19). Wiseman contends for a “practical-realities first approach” (p. 13). The target of his measured criticism is neither technology itself nor the contention that human biochemistry and neuroanatomy profoundly influence moral judgment and behavior (p. 110). The problems are found in the dehumanizing and deterministic claims being made about biomedical moral enhancement, the radical ambiguity of current empirical studies, and the reductive and excessive simplification of moral reality.

The underlying thesis of the book, according to Wiseman, is “that in the vast majority of cases, the biological aspects of moral functioning have been massively over exaggerated in their potential significance. The biological approach to moral functioning, while certainly valuable and enlightening when viewed cautiously, is not the most appropriate lens through which moral functioning should be looked” (p. 26). In short, biology is only one, and not even the most significant, factor in moral development. Consequently, we must reject “the grounding assumption of reductionist discourse that ‘we are our brains,’ that ‘my neurons made me do it’” (p. 267). If biological moral enhancement is to have any practical purchase, it must incorporate the whole of reality, including particular cultures, religious faith, and economic and political reality.

The tone of the book is captured by the following: “We must manage our expectations about what can plausibly be realized through biological moral enhancement” (p. 53). Expectations, for Wiseman, should be managed regarding the philosophy (Ch. 2-3) and science (Ch. 4-5) of moral enhancement. He rejects any philosophical or scientific underpinnings that narrate a fictional view of reality or reduce moral development to the biological. The use of pharmacology, genetics, neurostimulation, or any other biotechnology cannot eliminate personal responsibility, diminish communal investment in the development of virtuous characters, or ignore dimensions of living found in relationships, practices, and institutions (pp. 66-83). Granted, humans are embodied biological creatures and there are certain chemicals, hormones, and neurotransmitters the presence or absence of which set a biological context for certain kinds of behaviors and judgments (Ch. 4). The biology of the human being, however, does not eclipse the complex, nuanced, multifaceted, and inherently contextual nature of morality (p. 14) and neither can the practice of science quantify the qualitative nature of morality (pp. 134-36).

In the end, Wiseman is no thoroughgoing biological skeptic. If done properly, remedial moral enhancement is worth exploring and, in fact, is already being practiced

successfully in the treatment of some addictions, such as alcoholism (Ch. 9). In order to avoid clear dangers (Ch. 8), Wiseman proposes, “that if such intervention takes place in a mental health context, in a person-centered and fully bio-psycho-social fashion, one which respects the value and influence of personal agency, cultural scaffolding, and quality relationships, then we have begun to outline a context in which moral enhancement might be put to work in a positive and desirable way” (p. 220).

Overall, Wiseman offers a robust but fair criticism of reductive moral enhancement theory and science. Additionally, he proposes a convincing and appropriately cautious approach for integrating biotechnology with remedial therapy in mental health contexts. Those rooted in Christianity should appreciate Wiseman’s extended argument that religious faith and practice is significant for developing moral persons, although Evangelicals might find Wiseman’s sociology of or comparison of religions approach off-putting. His promise to be secular and agnostic regarding questions of superiority (p. 141) is understandable given the audience he seeks to reach, but the Christian faith is not simply context, and neither is Islam, Judaism, Hinduism, atheism, scientism, or any other worldview claim. The Christian faith is a lived story or depiction of reality, the way things are and ought to be in light of the revelation of God. That a religious tradition is true or false can have direct bearing on the legitimacy of its moral claims. In other words, the theological and moral claims of Christianity, granting various traditions, compete, sometimes tacitly and sometimes explicitly, with the claims of other worldviews regarding the good life.

Wiseman is not immune to the influences of popular cultural and political fictions, which he rightly criticizes regarding the myth of the moral brain (pp. 18-20). For example, without definition or substantiation and without reference to any particular, historical religious tradition, Wiseman identifies the rehabilitation of homosexual preferences and sexual reorientation therapies with “homophobic cultures, fundamentalist groups, and Putin’s Russia” (p. 74). Such guilt by association loses to solipsistic political rhetoric individuals who are struggling within faith communities to understand how sexual desires and practices relate to authoritative religious and rational beliefs. Some readers may wonder why Wiseman essentially brackets sexual desire and practices out of moral discourse. Historically and consistently Christ followers have been invited to live sexually pure lives consistent with the teaching of Scripture and distinct from surrounding cultures. Christian philosophers, theologians, counselors, and pastors would do well to consider the whole body in relationship to sinful practices and character development. The whole body includes sex, sexuality, and marriage. Moral application should, therefore, include reflection on sexual immorality in all its iterations.

Perhaps the most serious concern is that Wiseman’s apparent postliberal theological orientation does not allow him to answer the question, “Can we know objective moral truth”? In other words, what sets the target for moral enhancement

and development? He offers no real basis for moral truth beyond “a person’s powers of moral reasoning, self-criticism, and independent thought” (p. 185), yet he can rightly warn that some moral scaffolding can be abominable (pp. 184-88). The question remains, how do we judge right and wrong, good and bad, just and unjust? Can we legitimately speak of objective moral truths that are discoverable and knowable? Wiseman appears to accept a cultural-linguistic approach that locates moral development within particular communities, which, for Wiseman, “transcends consequentialist, deontological, and virtue accounts” of ethics (p. 241). In this ethical approach, however, no attempt is made to know or verify moral truth. In the end, each community will live only *as if* its confessions and practices are true. A more robust account of theological ethics is possible, however, because we live in a world in which God speaks and acts. Consequently, human beings can understand with confidence what is objectively right and wrong.

Despite the questions raised above, Wiseman provides a valid response to the biological reductionism current in the sciences and popular culture, as well as a helpful though truncated description of moral and character development in the Christian faith (Ch. 6). The book is not overly technical, but will require careful attention to terms and concepts unique to biotechnology, ethics, and to Wiseman’s own arguments. Ethicists, mental health practitioners, and theologians interested in the doctrine of humanity should read this book, which can also serve as a useful graduate level text in universities or seminaries. The pastor interested in how culture and science shape our popular understanding of and response to human ills will find this a stimulating yet sobering read.

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**Keller, Tim. *Making Sense of God: An Invitation to the Skeptical*. New York: Viking, 2016. 254 pages. \$17.70.**

Tim Keller has served as the founding pastor of Redeemer Presbyterian Church in Manhattan for nearly thirty years and has spent much of his ministry engaging skeptics of Christianity with both winsome humility and intellectual dexterity. *Making Sense of God*, which serves as an apologetic prequel to his previous book, *The Reason for God*, exudes the same charitable tone and rhetorical skill that those familiar with Keller’s work and ministry have come to expect. The book is a prequel in that Keller aims to present Christianity as desirable first, whereas in *The Reason for God*, he aims to present Christianity as rational. His basic supposition is that before a person will consider seriously *whether* Christianity is true, she must first *want* it to be true.

Keller essentially argues for two broad theses. He argues in the first section of the book that “every person embraces his or her worldview for a variety of rational, emotional, cultural, and social factors” (pp. 4-5). And, he argues in the final two

sections of the book that Christianity makes the most emotional, cultural, and rational sense while also supplying the resources for meeting life's needs in a way far superior to secularism.

Setting out to sustain his first thesis, Keller cites a major study conducted by the Pew Research Center that concluded that religion is on the rise whereas secularism is on a steady decline. The reason for this, he argues, is two-fold. First, secularism leaves out some crucial things necessary to living well. Second, many people sense intuitively that something exists that is beyond the natural world. He defends these claims well and with an impressive breadth of research. Though one might raise the question of how much of naturalism—embedded tacitly and so firmly in the modern conscious and reflected in the patterns, rhythms, and forms of culture—is unknowingly lapped up by these growing religions such that while much of their verbal content is “religious,” much of their formal content is thoroughly naturalistic.

He further sustains his first thesis by demonstrating that both belief in God and non-belief are based on a combination of faith and reason. He leans heavily on Michael Polanyi's as well as Friedrich Nietzsche's work for support. Polanyi argued that all knowledge is subjective in that it is known by subjects who all hold certain beliefs based on tacit knowledge, that is, knowledge that has not been rationally evaluated. Nietzsche argued that once God is taken out of the picture, all objective truth, values, and meaning go with Him. The secularist has claimed often that his beliefs are based on reason whereas the religious person's beliefs are based on faith. It is this claim that Keller masterfully takes apart in the first section.

In the second and third sections, Keller moves to argue that Christianity delivers stable meaning that can endure suffering, deep satisfaction that is independent of life's circumstances, freedom that avoids the naively thin modern conception of only freedom from constraints, a sense of self/identity that at the same time produces joyful self-affirmation and humble self-denial for the good of others, hope that can stare death in the face through the promise that paradise lost will one day become paradise restored, a grounded morality that can make sense of the moral feelings that all people experience, and justified support for human rights and compassion toward the oppressed. Keller evaluates all of these goods that most people in the modern Western culture would affirm as good, and shows how Christianity makes by far the most sense of human experience and lends the best tools for dealing with the unavoidable problems of life. Major influences on his work in these sections are Robert Bellah and Charles Taylor.

He concludes his book with two short chapters on some familiar rational arguments for Christianity. He briefly presents the cosmological argument, the teleological argument, the moral argument, the argument from consciousness, the argument from the trustworthiness of one's rational faculties, and the argument from beauty. C. S. Lewis formerly argued that materialism cannot account for one trusting one's rational faculties, and Alvin Plantinga expanded on this argument giving it

a more philosophically robust treatment in more recent days. This argument has generated a great deal of discussion recently, so Keller's inclusion of it is pertinent. His final arguments make a case for Jesus being who He claimed to be. He defends the credibility of the Scriptures, Jesus' character and wisdom, His claims of divinity, and the evidence for His resurrection.

Significant weaknesses are hard to find given that Keller sets his arguments up with great care as he avoids claiming more than he can demonstrate reasonably. The intuitive force of his arguments is also hard to ignore. One minor pushback would be that he writes throughout of "values" rather than of "virtue." This change in language over history is not insignificant given that the move to speak of "values" conveys a move away from universals and toward particulars. To be fair, he does write of "universal values," so the idea of universals might be present, but in a post-Enlightenment age that brought on its heels the loss of the universal, and consequently the turn from virtue to values, it would have been a welcome lingual corrective to write of virtue. Virtue will be virtue whether people value it or not.

The strengths of Keller's book are several. He presents a breadth and depth of quality sociological and philosophical research, making his arguments clear, well-supported, and fairly easily accessible to the thinking person. The inquisitive skeptic will find Keller's tone charitable and his approach inviting. It is as if Keller is saying to the skeptic, "Let's consider our common experiences of life and the things we most value. Now, would not this story, if it were true, explain these experiences and values very well? Would it not seem to grant you the things you most desire in life in a logically consistent and emotionally and culturally relevant way?" Keller's strategy is brilliantly perceptive of the modern secular mindset, in that he is not arguing for the truth of Christianity up front, but rather the beauty of it. His aim is to present Christianity in a desirable light so that the secular person will *want* to explore the rationality and truth claims of Christianity. Keller has produced an excellent resource that skeptics would benefit from greatly, whether they agree with the ultimate conclusions or not.

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**McKim, Donald K. *The Church: Presbyterian Perspectives*. Eugene, OR: Cascade Books, 2017, pp. 108, \$15.43, softcover.**

Donald K. McKim (PhD, University of Pittsburgh) is a retired minister in the Presbyterian Church (USA). He served for some years as Academic Dean and Professor of Theology at Memphis Theological Seminary, and in recent years has devoted much of his time to writing. Dr. McKim has written many books relating to Reformed theology and Presbyterian ecclesiology, including books on Martin Luther



and John Calvin, and the well-received *Westminster Dictionary of Theological Terms*, now in its second edition.

This current short volume, *The Church*, is a collection of six messages (thus six chapters) given to various assemblies of clergy and laity. As stated in the preface, these comprise a “theological reflection on the nature of the church” (p. ix). Though this is admittedly an introduction on such matters, Dr. McKim covers some of the more fundamental topics with reflections that span from devotional to theological. His writing style is very lucid. Immediately noticeable is his extensive use of quotes from some of the great theologians of the past, including Barth, Bonhoeffer, and well over 50 quotes from Calvin. Such weaving of words from these great theological minds into a more modern understanding of the nature of the church is very helpful, and keeps the discussion well-grounded.

The first of the six chapters is an effective devotional on the Call to Follow Jesus in the Church. Using the common acronym JOY, McKim states that following Jesus involves Joining ourselves to him by faith, Obedience to Jesus, and then Yielding to Jesus by denying ourselves (Mark 8:34). By way of application McKim asks, “What does our discipleship (our following Jesus) look like?” (p. 8). “We are connected” he says, “with someone who is going somewhere.” When Jesus bids us to follow him he invites us “to be a part of his work in history” (p. 8). Following Jesus involves “activity, movement, and growth,” without which “we are not truly followers” (p. 9). We are then enjoined to leave the past behind and look toward the future, to Jesus as our standard. “What matters most, and always, is whether what we are and what we do can be understood as following Christ” (p. 13).

Chapter two tackles the Latin phrase common in Presbyterian and other Reformed churches, *ecclesia reformata, semper reformanda secundum verbi dei*, which is translated “the church reformed and always being reformed according to the Word of God.” McKim provides good insight and a great overview of some of the scholarly analyses of this phrase, and leans toward a more liberal understanding. “This is why as Reformed people we are open both to new expressions of our faith, as in new declarations or confessions of faith as well as to the “revisability” of our confessional understandings based on insights from Scripture and the work of the Holy Spirit” (p. 22).

So does this mean the Christian faith must be open to endless revisions, or that the more a church changes its confession of faith the more reformed it is? I’m sure McKim would agree not, but where does one draw the line? Many conservative Presbyterian scholars would argue that to be Reformed (capital R) is to be as close to the biblical teachings of Christ and the Apostles as possible, which was what Luther and Calvin were aiming for in their striving to reform the church from its medieval distortions. So the “always reforming” would refer to the course adjustments needed from time to time to keep churches on the narrow way toward *ecclesia reformata*, the Reformed (truly biblical) Church.

McKim goes on to emphasize “openness” in a brief discussion of *adiaphora*, saying, “surely we should sit loose with a number of things.” *Adiaphora* (indifferent), refers to matters that are “neither commanded nor forbidden in the Word of God” according to the Formula of Concord of 1577. The author does not provide any specific examples, but of course such openness has a lot of wiggle room depending on how one interprets “commanded” and “forbidden.” With regard to controversies such as worship styles, gender roles, definition of marriage, and sexual identity, not only are there differences in how one does hermeneutics, but there is also the question of how much the world should be allowed to influence the church versus how effectively the church should be salt and light to the world, a question all churches struggle with.

The next three chapters are taken from the last section of the Apostle’s Creed with its focus on the Holy Spirit, the holy catholic Church, and the communion of saints. McKim draws deeply from Calvin and Barth here as he reflects on the ministry of the Holy Spirit in the life of the Church. He distinguishes well between the invisible true Church of God’s elect and the visible church, while cautioning strongly against leaving her.

The last chapter “Imagine the Church!” is motivational. Here McKim does a particularly good job of addressing the Presbyterian emphasis on the providence of God who preserves all of creation, accompanies his people through relationships, and governs or directs all things according to his purpose.

In addition to this book, a student interested in studying the nature of the church from a Reformed perspective would do well to read two recent books co-authored by Michael Allen and Scott R. Swain: *Reformed Catholicity: The Promise of Retrieval for Theology and Biblical Interpretation* (Baker, 2015) and *Christian Dogmatics: Reformed Theology for the Church Catholic* (Baker, 2016).

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**Wright, Christopher J. H. *How to Preach and Teach the Old Testament for All Its Worth*. Grand Rapids, MI: Zondervan, 2016, pp. 288, \$18.99, softcover.**

Christopher J. H. Wright serves as the International Ministries Director of the Langham Partnership, an organization dedicated to the international advancement of the Gospel. He has also taught the Old Testament in various countries and has authored several books dealing with the Old Testament, ethics, and mission.

The structure of the table of contents for *How to Preach and Teach the Old Testament for All Its Worth* shows that it deals with points of theory and practice. The first five chapters answer the question, “Why should we preach and teach from the Old Testament?” (p. 9). Here Wright connects the major contours of the Old Testament to the theme of redemption revealed throughout Scripture. Thus, the author begins his

work with a focus on theory. The final ten chapters respond to the question, “How can we preach and teach from the Old Testament?” (p. 9). Wright here covers practical concerns when preaching from the different genres in the Old Testament. The book then concludes with two appendices and a bibliography which supply summary details for readers who wish to engage in further learning and practice.

For those acquainted with introductory resources on hermeneutics and biblical studies, the title for Wright’s volume should sound familiar. It is a recent installment in a series which began with Gordon Fee and Douglas Stuart’s *How to Read the Bible for All Its Worth* (Zondervan, 1981). This series provides an overview for interpreting Scripture well, and Wright’s contribution to this series accomplishes this goal in at least three key ways.

First, the author writes like an effective communicator. He provides excellent illustrations and practical examples throughout the book for rather complex hermeneutical concepts. Second, Wright demonstrates how to preach from the Mosaic Law in a multifaceted manner. For instance, when discussing various reasons why God gave His Law to Israel (pp. 138-158), the writer notes that the Law should be understood from positive perspectives in light of God’s overall plan of redemption and not only in reference to Paul’s discussion of the Law as he contended with first-century Judaizers (pp. 138-141). Third, the author interacts with each major section of the Old Testament, that is, its narratives, the Law, the Prophets, and the Writings (pp. 85-283).

While this resource should prove helpful to students in light of the above points, there are still aspects of the book which could use additional clarification. To begin, since the title of the book mentions the words “preach and teach,” it would seem readers who are interested in hermeneutics and homiletics could expect clarity on both of these fronts. However, the structure of some of the sample sermons may be confusing to readers focused on homiletics in particular.

For example, Wright’s first sample outline focuses on Genesis 22:1-19, and his sermon unpacks this text with a brief discussion of verses 1, 2, 5-8, 9-10, 11-14, and 15-18 (pp. 134-136). So the flow of thought in his sermon aligns with the flow of thought in the focal passage. However, the next sermon outline is taken from Genesis 18:19-21. Yet, Wright’s text selection only deals with a portion of its larger context and covers verse 21 first, verse 18 second, and verse 19 third (pp. 159). While only three of Wright’s nine outlines show a lack of alignment in this way, this nevertheless accounts for a third of the outlines in the book, and since the book’s title mentions preaching, additional clarity on this point would be helpful.

Lastly, Wright appears to take a special interest in Old Testament narratives, and he makes great points in this section of his work (pp. 87-133). Among the various nuances related to this topic, he emphasizes how biblical narratives should not be severed from the overall biblical story line of redemption in order to be presented as isolated stories about moral principles or deeper spiritual insights. Rather, the

connection of Old Testament stories to their larger contexts should remain in clear view (pp. 119-133). Yet, the proverbial baby may get thrown out with the bath water because one has to wonder if this point is over emphasized at times, especially when Wright and the biblical text seem to demonstrate how Old Testament narratives teach various principles in addition to their main theological thrusts.

For instance, Wright explains, “Many of the single stories and longer narratives in the Old Testament show what it means to hear God’s promise and respond to it...So, at one level, they point to the trust and obedience of human characters. But more importantly, they point to the faithfulness of God. God can work through even the most difficult or dangerous circumstances (think of Joseph)” (p. 113). While the author provides an excellent emphasis on God’s faithfulness in the biblical narratives, he nevertheless appears to acknowledge that these stories also provide illustrations of principles for obedience and faithfulness and how they can apply today.

Also, it seems the biblical text recognizes how scriptural narratives teach God’s truth in a variety of ways. For instance, in Joshua 22:13-20 some Israelites conclude their thoughts in this passage with an articulation of a theological principle they learned from a previous narrative event in the nation’s recent history, specifically, the sin of Achan (Joshua 6-7). Obviously, the Israelites learned from this narrative that when one person in the covenant community sins, there is collateral damage. Additionally, in 1 Corinthians 10:6-13 Paul refers to several Old Testament events to challenge the Corinthians to avoid various types of sin and temptation. Twice in this passage Paul teaches that these Old Testament stories are examples for New Testament Christians to take to heart in their sanctification process. Thus, the Old Testament narratives supply teaching about God’s overall story of redemption as well as valid principles and application points for contemporary Christians.

In fact, Keller emphasizes a related point in his *Preaching: Communicating Faith in an Age of Skepticism* (Viking, 2015). He contends, “In some Bible passages it is not easy to discern one clear central idea. This is especially true in narratives” (p. 43). While Keller does not completely dismiss the idea of a central theme for biblical texts, he nevertheless urges expositors to consider how “Not only the [biblical] author’s major points but also his minor points should be attended to, since they are also from God” (p. 250). It would be helpful for Wright to include more clarity on this type of balanced view for preaching Old Testament stories as well.

Wright’s work is an excellent hermeneutical resource for those who are beginning a serious study of the Old Testament, especially with a view to teaching it well in the church. He presents solid material in an accessible manner, and he provides direction to readers who wish to engage this information in a more technical fashion. However, readers who are primarily interested in the homiletics side of the title may not find as much help in Wright’s book. For these students, a standard introduction to expository preaching should provide assistance such as Haddon Robinson’s *Biblical Preaching: The Development and Delivery of Expository Messages* (Baker Academic, 2001) or

Tony Merida's *Faithful Preaching: Declaring Scripture with Responsibility, Passion, and Authenticity* (B&H Academic, 2009). A combination of Wright's hermeneutical insights coupled with Robinson's or Merida's homiletical insights should furnish learners with a great introduction to the areas of interpreting and communicating the Old Testament effectively.

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**Anderson, Jonathan A., and William A. Dyrness. *Modern Art and the Life of a Culture: The Religious Impulses of Modernism*. Downers Grove, IL: IVP Academic, 2016, pp. 374, \$24, paperback.**

An Associate Professor of Art at Biola University, Jonathan A. Anderson is himself an artist and art critic. He has also afforded his artistic sensibilities to theological conversations, having coauthored the book *Renewing Christian Theology: Systematics for a Global Christianity* (Baylor University Press, 2014). William A. Dyrness is a respected scholar in the field of theology and the arts and has authored several books, including *Visual Faith: Art, Theology, and Worship in Dialogue* (Baker Academic, 2001), *Reformed Theology and Visual Culture: The Protestant Imagination from Calvin to Edwards* (Cambridge University Press, 2004), and *Poetic Theology: God and the Poetics of Everyday Life* (Eerdmans, 2011). Additionally, he is Fuller Theological Seminary's Professor of Theology and Culture. In *Modern Art and the Life of a Culture*, Anderson and Dyrness have combined their expertise to provide a treatment of modern art that is historically accurate, aesthetically conscientious, and theologically grounded.

Anderson and Dyrness wrote *Modern Art and the Life of a Culture* as a response to Hans Rookmaaker's influential book *Modern Art and the Death of a Culture* (InterVarsity Press, 1970), which has long served as a guide to culture and the arts for many evangelical Christians (pp. 9, 44). While the authors respected Rookmaaker's influence and insight (p. 69), they ultimately rejected Rookmaaker's suggestion that modern art predominantly sought to subvert religious belief; they argued instead that Christianity "continued to influence and constructively shape the development of the modernist avant-garde" and that "modernist artists were attempting to come to terms with (the meanings of) life in the age of modernity" (p. 10; see also p. 29). Thus, the authors contended that modern art—even that which is hostile toward organized religion—is profoundly spiritual and theological (pp. 41, 47). However, while Anderson and Dyrness sought to substantiate the important role of theology in modernism, they also avoided "Christianizing" art history to fit their narrative (p. 46), making clear that "to claim that religious traditions are alive and well in modern art would be claiming too much" (p. 41). Moreover, they acknowledged that

“antagonism toward Christianity certainly had its influence on the rise of modern art” (p. 90). Even still, Anderson and Dyrness dismissed the widely accepted narrative that “religion played almost no constructive role at all in the development of modern art” (p. 18), and they meticulously chronicled the interplay of religion and modern art within European and North American contexts.

The high value of *Modern Art and the Life of a Culture* should be apparent. While commentators such as Rookmaaker and Francis Schaeffer have tended to view modern art as being hostile toward religion (and in some cases, rightfully so), Anderson and Dyrness have successfully shown the prominent role that Christian theology played in the development, subject matter, and style of modern art. For instance, the authors convincingly demonstrated that Catholic revivals in France in the nineteenth century had a major impact on modern artists, suggesting that modernism and religion are not necessarily mutually exclusive and that the “language of [modern] art [could] express Christian themes” (p. 136; see also pp. 90, 101). The authors also defended abstract art, viewing it not necessarily as a rejection of the created order (as is often charged in evangelical circles) but rather as a recognition of divine transcendence that surpasses reason and representation (p. 196; see also p. 182); indeed, the authors espoused that American Protestantism’s emphasis on personal experience and general revelation in nature “influenced the rise of abstract expressionism in North America” (p. 277).

Anderson and Dyrness brought credibility to their argument that theological questions played an important role in modern art by pointing to major figures within modernism, including Paul Gauguin, Vincent van Gogh, and Paul Cézanne (p. 44). Perhaps most interesting was the authors’ treatment of Andy Warhol, who is probably best known for his depictions of Campbell’s soup cans and of cultural icon Marilyn Monroe (pp. 314-15). While some critics have seen Warhol’s work as a sign of art’s demise, Anderson and Dyrness framed Warhol’s work within the context of his Byzantine Catholic faith (though, to say the least, elements of Warhol’s life and work would certainly seem to contradict that faith) (pp. 311, 314). As such, they interpreted Warhol’s paintings as modern day *vanitas* still-life works, which “emphasize the fragility and delicacy of the world” (p. 319). They further asserted that Warhol’s religious works (such as his *Last Suppers*), which on the surface may appear to be disrespectful to Christ/Christianity, are not “attacking religious belief but [are instead] ‘labeling’ one of the major modern obstacles to it [i.e., commercialism and consumerism]” (p. 324).

The breadth of scholarship in *Modern Art and the Life of a Culture* is tremendous. However, the book could have been further enriched by some reference to non-Western art. But because the book is largely a response to Rookmaaker, who dealt mostly with European and American art, this omission is forgivable to an extent. The authors themselves acknowledged this intentional limitation for the purposes of this book (pp. 12-13, 45), and they did include in their discussion some important and notable minority artists, such as Henry Ossawa Tanner (pp. 258-61). Still, their



exclusion of non-Western voices unnecessarily opens the authors up to criticism from the very artistic and academic circles with whom they are seeking to engage with this book. Moreover, if, as the authors admitted, “a variety of non-Western modernisms . . . have even stronger threads of religious and theological content [than those in the West]” (p. 45), the inclusion of non-European and non-American artists would have greatly bolstered the authors’ arguments and further substantiated their critique of Rookmaaker.

Rookmaaker’s book was important for its time, and Rookmaaker has greatly impacted a generation of evangelicals in regard to engagement with the arts. Anderson and Dyrness respected this contribution while also providing necessary rectification. They asserted that while evangelicals have tended to highlight the negative aspects of modern art (such as perceived hostility toward Christianity), believers have often ignored the positive components of Christian influence within modern art and the profoundly spiritual questions that arise within modernism. Therefore, this volume by Anderson and Dyrness is a crucial contribution to the field of theology and the arts and is highly recommended for students of this discipline. Students would also do well to read Peter Gay’s *Modernism: The Lure of Heresy from Baudelaire to Beckett and Beyond* (W. W. Norton & Company, 2008) and James Elkins’s *On the Strange Place of Religion in Contemporary Art* (Routledge, 2004) to round out their understanding of religion in relation to modern art.

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**Martens, Paul. *Reading Kierkegaard I: Fear and Trembling*. Cascade Companions. Eugene, OR: Cascade Books, 2017, pp. 103, \$18, paperback.**

Paul Martens is associate professor in the department of religion at Baylor University, which, along with Martens, also employs C. Stephen Evans (department of philosophy) and Jan Evans (department of Spanish), making Baylor home to Kierkegaard scholars in three different departments and a recent hub of Kierkegaard scholarship, especially as Kierkegaard pertains to Christian Ethics. Martens has two other introductory books on Kierkegaard forthcoming, one on *Works of Love* in the same Cascade Companions series as *Reading Kierkegaard I* (hereafter, *RKI*), and another, presumably more general introduction to Kierkegaard in Eerdmans’ Intervention series.

*RKI*, as its subtitle suggests, and as per the mission statement of the Cascade Companions series within which it is found, is an introduction to the writing of Kierkegaard for the non-specialist. It differs from other books in the series, however, by working as an introduction to one non-biblical book as opposed to the corpus of a Christian thinker. As such, it works like a short commentary on *Fear and Trembling* (hereafter *F/T*) with a brief introduction and conclusion that offer some ideas as to

how understanding *F/T* might aid one in his or her reading of Kierkegaard's other early pseudonymous works.

After a brief introduction to Kierkegaard's life and works in general and how *F/T* fits within his oeuvre, Martens organizes the rest of his book to follow *F/T*. Each chapter after the introduction of *RKI* bears the name of the corresponding chapter in *F/T* as translated by Sylvia Walsh in the 2006 Cambridge University Press edition. That is, *RKI*'s second chapter is titled "Tuning Up," Walsh's English translation of the original Latin title "Exordium." Quotations of *F/T* are also taken from the Walsh translation, but Martens cites page numbers for both the Walsh translation and the more familiar Hong/Hong translation from Princeton University Press.

Each chapter is not merely a summation of the corresponding chapter from *F/T* but offers a strategy for understanding that section of Kierkegaard's notoriously difficult text. In order to make for the simplest of readings, Martens relies entirely on his own interpretation of Kierkegaard/de Silentio, foregoing any other scholars' receptions of the text. The footnotes refer, with only a very few exceptions, to Kierkegaard's corpus, the Bible, and Hegel.

The end product of *RKI* is a distillation of *F/T* through the eyes of Martens, who views *F/T* as fitting within Kierkegaard's larger program *vis-a-vis* the Danish Church in the mid-19th century and the paradoxical nature of true faith. The faith journey, through which Kierkegaard tried to lead people ironically, requires a sensitive commentator, aware of the importance of each step in *F/T*'s analysis of the testing of Abraham's faith. Thus, Martens, despite showing a developed thesis of the meaning of *F/T*, attempts to stay somewhat out of the way, answering the reader's inevitable questions of the source material mainly as it unfolds in the given chapter of *F/T*. I should reiterate this last point: *RKI* is most certainly not meant to be read in place of *F/T* but in conjunction with it.

Such a conflict in purpose and actual practice is a likely inevitable problem, especially for such a mysterious book as *F/T*. It is hardly Martens' fault if readers neglect the source material for his more easily digestible commentary. Nevertheless, it is a shame. As I was reading through *RKI* I reread *F/T* and would find myself spellbound again by di Silentio's juxtaposed retellings of Abraham's journey to Mount Moriah. Are they troublingly opaque? Yes, of course they are. But so is the biblical source material. Kierkegaard understood the moral challenge of the *Akadah* and so did not attempt to make it less so in his interpretation. Rather, *F/T* is a kerygmatic application for the present age that updates Abraham without making him too palatable. An easy application that explained everything would fall into the trap of the dominant Christendom of the era. And yet, no one can really blame Martens for attempting to "explain" Kierkegaard. *RKI* is not to *F/T* as *F/T* is to Abraham and Martens' explains as much, admitting that "in no way do [his] comments capture the depth of *de silentio*'s poetic genius on display" (12). Attempting to match the poetry of *F/T* would, in fact, be counterproductive for a book in the Cascade Companion

series, which intends to introduce non-specialist readers to important subjects in the Christian tradition. As such, *RKI* succeeds, as disappointing as it may seem at first to read next to the opaque (in style) and dark (in subject matter) but beautiful *F/T*.

Clarity, not opacity, should be the goal of a commentary or introduction such as *RKI*, and one way to aid in clarifying the source material is to include well organized appendices, which *RKI* has. Along with a general index and bibliography, Martens includes a brief bibliography of suggested reading for those interested in further engagement with *F/T*, along with a timeline of Kierkegaard's authorship from 1841-46 as a helpful reference. Also helpful is a 10-page glossary (which makes up about 10% of the book as a whole). Included in the glossary are people such as Kant, Regine Olsen, and Aristotle, movements like Stoicism and Pietism, concepts such as absurd and eternity, and biblical and classical characters such as Jephthah and Agamemnon. Strangely absent, however, are other worthy concepts relative to Kierkegaard's writing such as Socrates, one of the models for Kierkegaard's ironic rhetoric, and subjectivity, a right tricky subject highly relevant to Kierkegaard's first authorship.

Nevertheless, *RKI* is a worthy introduction to the difficult *Fear and Trembling* and Kierkegaard's pseudonymous authorship as a whole. Its brevity (and price) will likely persuade the curious but uninitiated to dig into *F/T* in a way that is accessible and not obtrusive so that the reader can enjoy the source material for itself without being scared away by the meandering and often confusing *Fear and Trembling*.

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**Seitz, Christopher R. *Joel*. The International Theological Commentary. New York: Bloomsbury T&T Clark, 2016, xii + 239 pp., \$94.00, hardback.**

*Joel* is the third publication in T&T Clark's new International Theological Commentary series. The series evidences the concerns and hermeneutical methods of the Theological Interpretation of Scripture "movement" (pp. ix-x). Christopher Seitz has written extensively on the topic of theological hermeneutics and the Old Testament prophets, most relatedly, his *Prophecy and Hermeneutics*. This commentary on Joel affords him the opportunity to apply his methodology to an entire biblical book. Seitz is a senior research professor at Wycliffe College, Toronto and currently serves as the editor of *Studies in Theological Interpretation*, Baker Academic.

*Joel* is comprised of two equal-length parts. The first contains several chapters discussing introductory issues. With newer redaction theories of the minor prophets in view, Seitz argues for the literary integrity of the final form of Joel (p. 6, see p. 62 for arguments against the older redaction theories of Duhm). He favors a canonical reading of Joel which spots intertextuality throughout the book of the Twelve, that is, how Joel has been influenced and how Joel influences a reading of the other minor prophets (p. 23). Seitz, however, does not overlook diachronic issues, and understands

Joel to be a late work drawing upon earlier prophetic themes (p. 28). Thus, the post-exilic composition of Joel not only re-signifies earlier Scripture but, by virtue of the canonical order, it becomes the lens through which the following (historically earlier) books of the Twelve are to be read (p. 21). Specifically, Joel “has been composed to respond to the scenario set out at Hosea’s conclusion” (p. 55). Additionally, it is also an *historical* phenomenon that the final literary product of Joel is intentionally de-historicized and anonymous. Seitz argues that this is intentional so that Joel’s message can move “through time” (pp. 51, 114) with ongoing significance.

The second section of the book is the commentary proper. It begins with providing the New Revised Standard Version translation of Joel for reference. Seitz divides up his commentary into (i) Solemn Opening: 1.1–4, (ii) Part One- The Day of the LORD Upon Israel: 1.5–20, (iii) Part Two- The Unfolding Day of the LORD: 2.1–27, (iv) Part Three- Finale: 2:28–3:21.

By inductive study of Joel, Seitz redefines prophecy in a way that might not at first be expected. He argues that the author of Joel is a literary artist drawing upon earlier Scripture more than a prophetic preacher like, say, Amos might have been. This is one of the highlights of the commentary, namely the intertextual connections made by Joel noted by Seitz. These include the reference to the Exodus through a locust plague (p. 125), the description of the day of the Lord is viewed as “un-creation” (p. 151), the evocation of Deuteronomy in the call to return to the Lord with all your heart (p. 162), the pouring out of the Spirit hearkening back to Numbers 11 (p. 197) and the fountains flowing out of the restored Zion suggest the rivers flowing from Eden (p. 221). Seitz, therefore, understands Joel the “prophet” as an interpreter of Israel’s Scripture rather than one receiving direct revelation from God.

It is important for Seitz to view Joel as a post-exilic book to establish authorial intentionality in Joel’s allusions to earlier Scripture. For example, in 2:32, Joel is understood to be citing Obadiah 17 (p. 192). However, when Seitz discusses the relationship between Jonah—understood also to be a late post-exilic work—and Joel he concludes that determining the “absolute sequence of dependence” has “limited value” (p. 175). Seitz throughout seems to advocate a canonical intertextual reading based on authorial intention. Thus, it is unclear why he states establishing the direction of dependence between Jonah and Joel, albeit difficult, has limited value given two almost certain instances of literary dependence (2:13 and 2:14 with Jonah 4:2 and 3:9).

While Seitz does not overlook the effect of the canonical position of Joel on reading the minor prophets, he prefers to understand Joel as an “organic conception” without secondary editors (p. 185). Thus, in his view, there would be no place for a canonical redactor or final editor of a “Book of the Twelve” who, for example, might have used *Stichwort* to link the books together. And so, for example he disagrees with Nolgaski who reads “this” in Joel 1:2 as anaphoric, referring to the end of Hosea (pp. 46, 116). Moreover, he argues that the “individuality” of the books of the Twelve

should be maintained, and so Amos 9:13 and Joel 3:18 should not be read together within the Twelve, but within their respective books (p. 213, fn. 40). This outlook is refreshing in the current milieu of scholarship which largely view the minor prophets to have been redacted as one book—The Book of the Twelve. Interpreters, naturally thus, look for “redactorial” intention across the *one* Book of the Twelve which results in flattening out the unique contribution of each minor prophet—something Seitz avoided in this commentary.

Sadly, the book seems poorly edited with several errors. For example, “2011” should read 2009 (p. 5, fn. 4), “Joel” should read Amos (p. 10), “Micah” should read Jonah (p. 15), and “Zephaniah” should read Joel (p. 201). The Hebrew font used appears to be SBL, but on occasion an irregular font is used (pp. 164, 166 etc.) and at times the spacing between Hebrew words is not kept (pp. 148, 226). Moreover, English versification of Joel is used, but at times, without explanation or any self-evident reason, the Hebrew versification is used, and at times both are used confusingly on the same page (pp. 130, 201).

The best example of theological interpretation comes at the close of the book. Throughout, Seitz does not understand the presence of “eschatology” to be a late addition, but rather it is the theological accomplishment of Joel to display eschatology at work in the present time. This phenomenon could be described as “already-not-yet” within the Old Testament itself. Though he does not use this term, Seitz notes the similarity between Joel and the Gospel’s presentation of eschatology:

In something of the same manner, the synoptic Gospels all describe the final day of the LORD, not as the last word of their respective literary witnesses, but prior to the passion narratives which take up where they leave off (Matt. 24; Mk. 13; Lk. 21). Abandonment, betrayal, tribulation, the wracking of creation, national enmity – all these mark the end times. But, equally, they constitute the conditions that One Cross and One Lord embody at the middle of time. Inside an act in the middle of time, the end times are played out in judgement by the Lord of time and life upon the Lord of life and time. (p. 226)

*Joel* is a welcomed addition to the commentaries on Joel. It is unique in that, though a commentary proper, it is also integrated with extensive engagement with modern scholarship of the minor prophets. Given the importance and debate over of the book of Joel in modern redaction theories, it would have appeared a grand omission had Seitz not engaged in the discussion in this commentary. However, given the preface to the series that the commentaries will glean from “classical and modern commentary” showing “doctrinal development”, will be “(a)lert to tendencies toward atomism, historicism and scepticism” and will also address “contemporary questions” (pp. ix–x), the commentary falls short. There is not the level of engagement with classical commentaries, ecclesial tradition, doctrinal developments and contemporary applicability one would expect from a title in this series. This is not a critique of

the content of the commentary, but rather a misleading title. That minor critique notwithstanding, serious students of Joel cannot afford to overlook this valuable new resource.

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**Strauss, Mark L. *The Biblical Greek Companion for Bible Software Users*. Grand Rapids, MI: Zondervan, 2016, pp. 112, \$18.99, paperback.**

Mark Strauss (PhD, Aberdeen) is professor of New Testament at Bethel Seminary (San Diego). He has written extensively in New Testament studies, translation, hermeneutics, and application. His books include *The Davidic Messiah in Luke-Acts*; *Four Portraits, One Jesus: A Survey of Jesus and the Gospels*; *How to Read the Bible in Changing Times: Understanding and Applying God's Word Today*, and *Mark* in the Zondervan Exegetical Commentary on the New Testament. His *Biblical Greek Companion for Bible Software Users* is a useful resource created to help pastors, teachers, and students engage the original languages.

Bible software programs have revolutionized the way students of the Bible access, study, and engage the Scriptures. They have also revolutionized the way schools are teaching the biblical languages. Many schools have modified language tracks, teaching the biblical languages while assuming the assistance of such programs. These courses or tracks do not expect memorization and mastery of forms and vocabulary because the information is readily available with a click through programs such as *Logos*, *BibleWorks*, and *Accordance*. It is for this new context that Strauss makes this contribution.

This *companion* is a tool for students and pastors providing quick-reference and user-friendly explanations of the grammatical information encountered when using Bible software programs. The book arranges its topics alphabetically and provides concise explanations of grammatical terms. Each entry covers the grammatical information provided by the Bible software programs in a concise two-page explanation of forms, primary functions, and exegetical insights. The exegetical insights provide an example of how the grammar is relevant to interpretation.

The book targets a few different categories of pastors, teachers, and students. These include those who have learned the languages in the past but struggle to use them consistently because of the demands of ministry. The book also targets students who are currently engaged in language courses, students who are in a program that does not require them to master the languages, and students who have not had the opportunity to learn the languages formally but want to gain deeper insight for their own studies.

As described above, the book treats grammatical terms alphabetically like a lexicon or dictionary (from Accusative to Vocative). Three additional appendices



address less interpretively significant matters such as accents, breathing marks, pronunciation, and punctuation. In terms of strengths, Strauss has produced a very useful tool. Its simplicity and concise explanations provide for Greek readers what Strunk and White's *Elements of Style* provides for English writers. Pastors and Bible students would do well to have it within arm's reach. Bible Software users and students should use it as a go-to-resource for quick answers to grammatical questions they encounter in the work of translation and interpretation.

The exegetical insights provide helpful examples to highlight interpretive significance and model exegetical decision-making. For example, Strauss' exegetical insight for the neuter gender clarifies the relationship between the masculine pronoun, *ekeinos*, and the neuter noun, *pneuma* (Spirit) in John 16:13. He provides a reasonable pause for the interpreter who sees grammatical evidence of Trinitarian personhood by pointing to the masculine antecedent, *paraklētos*, in 16:7 (p. 51). Another example is his insight for Ephesians 2:8 under the entry for the feminine gender. He helps the interpreter reason through the interpretive options and illustrates how gender is key to its interpretation (p. 31). One of my favorite exegetical insights came unexpectedly in his explanation of interjections. Here he offers examples of the challenges faced by translators and reason students must slow down when translating even seemingly insignificant parts of speech (p. 45).

Most of what I offer as critique is admittedly nit picking. However, the book's primary advantage (i.e., its conciseness) also gives occasion to its primary challenge. For example, in his exegetical insight for the future tense, he gives an example of the imperative future. In it, he claims this use of the future "provides a more solemn tone than a simple imperative" (p. 33). However, there is not sufficient explanation why this is so. Additionally, the book's conciseness hurts the explanations of grammatical functions and certain structural indicators at times. For example, when explaining the three different uses of the adjective (i.e., attributive, substantive, and predicative), there is no explanation of the structural clues one may use to determine which to use in translation (pp. 14-15). The same is true for his explanation of infinitives and their use with articles and prepositions. Space does not allow an explanation for how articles and prepositions work with the infinitive (pp. 42-43).

Overall, Strauss has produced a very useful tool, and it expands Zondervan's many excellent resources for students of biblical language. This tool is worth having within arm's reach for pastors, teachers, and students learning Greek, coming back to Greek, or still working towards fluency. For those schools and seminaries offering language courses or tracks that lean heavily on any of the Bible software programs, this book should be considered as part of the required or recommended resources. However, Strauss' book will not be as helpful for the student without history with Greek or without a more complete grammar also on her or his shelf. This tool serves well to jog one's memory but not to instruct the completely uninitiated; there is simply not enough detail and context to be useful for one untrained in Greek or biblical

interpretation. Of course, this should not be taken as a critique since Strauss did not intend to provide a comprehensive grammar. Overall, I applaud and thank Professor Strauss and Zondervan for providing another great language tool.

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**Van Pelt, Miles V., ed. *A Biblical-Theological Introduction to the Old Testament: The Gospel Promised*. Wheaton, IL: Crossway, 2016, pp. 601, \$50.00, hardback.**

*A Biblical-Theological Introduction to the Old Testament* and its New Testament counterpart are projects undertaken by the faculty, both current and past, of Reformed Theological Seminary (RTS). The project was dedicated in honor of the seminary's fiftieth anniversary. Miles Van Pelt edited the Old Testament volume and wrote both the introduction and the chapter on the Song of Songs.

Whereas most introductions to the Old Testament discuss the historical-critical issues of each book, these issues have only a minor role in *A Biblical-Theological Introduction to the Old Testament*. Instead, the book offers an introduction to the theological themes contained within each book of the Old Testament. After an initial section discussion on the structure and message of the Old Testament, the book dedicates a chapter to each of the books in the Old Testament as they appear in the Hebrew Bible. Each chapter is divided into sections labeled "Background Issues," "Structure and Outline," "Message and Theology," and "Approaching the New Testament." The "Message and Theology" sections make up the bulk of each chapter.

The book's main strength is the greater emphasis placed upon the theological message of each book compared to most other Old Testament introductions. The authors never diminish the importance of the historical-critical issues contained in most introductions, yet *A Biblical-Theological Introduction to the Old Testament* contains more extensive discussions of the theological message of each biblical book. The decision to focus on the theological message of each book will provide a helpful framework to guide students and pastors studying any Old Testament book.

In addition to a helpful emphasis on theology, each author brings their own specialties to their contribution. For example, some contributors develop their discussions against the backdrop of other ANE cultures, while others focus upon the literary features of the biblical text. Since this is the case, however, readers will likely find some chapters more helpful than others, depending upon their own preferences.

Although the theological focus of this book will provide readers with a unique volume of Old Testament introduction, some elements of the book hinder it from being as helpful as it could be. First, the books are mainly approached as isolated units rather than as parts of an integrated whole. In the Introduction, Van Pelt attempts to demonstrate how each Old Testament book fits together, but this emphasis is

absent in many of the chapters featuring the individual books of the Old Testament. Furthermore, there is no attempt to trace specific themes, such as God's presence, covenant, or sacrifice as they are developed throughout the Old Testament. Each book is essentially treated in isolation from the other books.

Second, the authors approach their tasks with a variety of methodologies, which are sometimes incompatible. For example, Van Pelt's introduction highlights the importance of the Hebrew arrangement of the Old Testament canon (p. 25). In this arrangement, the twelve Minor Prophets are typically regarded as a single work called *The Book of the Twelve*. Yet Timmer, in his chapter on *The Twelve*, asserts that this approach neglects the individual nature of each book and that the books should be studied separately (p. 326). He discusses theological themes which appear within *The Twelve*, but he clearly thinks this practice contains several pitfalls and the manner in which he discusses the themes could be used to discuss the connections these books have in common within any biblical book, not just among *The Twelve*. The Hebrew arrangement also places Ruth after Proverbs, but Yeo's chapter on Ruth only passingly refers to this arrangement and discredits its helpfulness (p. 404). Yeo is much more concerned with reading Ruth within the context of Judges and 1 Samuel (pp. 401–403), the arrangement found in modern Bibles, than he is the Hebrew arrangement which Van Pelt develops within the introduction.

Third, in addition to methodological variety, each author seems to have a unique conception of their assignment, and they approach their task in a wide variety of ways. Currid, the author of the chapters on Genesis and Exodus, frequently discusses the theology of these books against a historical reconstruction of the beliefs of other ANE cultures. Yet, McKelvey, the author of the Leviticus chapter, makes no use of ANE material and attempts to describe the major theological themes appearing within the text of Leviticus. Glodo, the author of the Numbers chapter, differs from Currid and McKelvey by attempting to give a theological summary of each section of Numbers. Redd, the author of the Deuteronomy chapter, understood the "Approaching the New Testament" section very differently from each of the previous authors. He discusses the importance of Deuteronomy within the Pentateuch, the Former Prophets, the Latter Prophets, and finally the New Testament (pp. 152–157). Thus, even among the four authors who wrote chapters on the Pentateuch, their approaches to biblical theology differ widely, and they understood the goals of each section within their chapters very differently. This wide variety of approaches is typical for the rest of the book and does not allow for a unified product to emerge.

These difficulties perhaps stem from the absence of a definition of "biblical theology" at the outset of the book. Although a definition of biblical theology may seem obvious to some, when examining various works claiming to discuss biblical (or New or Old Testament) theology, it is apparent that biblical theology is understood in a wide variety of ways. Sometimes these differences in how biblical theology is conceived stem from significant hermeneutical differences among authors. At this

point, one cannot simply label a work as “biblical theology” and assume that this will mean the same thing to every reader or even to every contributor even if they all have connections to an institution such as RTS. Since this is the case, a book that attempts to outline the theology of each Old Testament book without a definition of biblical theology will suffer from multiple approaches and lack the uniformity a reader may expect when first encountering the book. Perhaps if a definition of biblical theology had been proposed and the authors had attempted to integrate their contributions more, the difficulties noted in this review could have been resolved.

As noted above, these deficiencies limit the usefulness of *A Biblical-Theological Introduction to the Old Testament*. The book does not provide the reader with an integrated theology of the entire Old Testament but instead a medium-length introduction to the theological contents of each book of the Old Testament. The chapters are more extensive than entries typically found in Bible dictionaries and under the “theology” section of most commentary introductions yet briefer than monographs discussing theological issues of a specific book. This allows the book to fill a gap between these two types of resources, which should be beneficial to many seminary students and pastors. Unfortunately, since there is little to tie the chapters together other than a very general structural outline, it is difficult to recommend this book over other similar works such as *Theological Interpretation of the Old Testament* edited by Vanhoozer. Only the student’s preference for a particular author will help him or her determine which book to consult.

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**Geiger, Eric and Kevin Peck; *Designed to Lead: The Church and Leadership Development*. Nashville, TN: B&H Publishing Group, 2016, pp. 234, \$22.99, hardback.**

Eric Geiger is a vice president of the Resources Division at LifeWay and a pastor of a local church in Tennessee. He has a doctorate in leadership from The Southern Baptist Theological Seminary and has authored or coauthored several books including the best-selling church leadership book, *Simple Church*. Kevin Peck, also with a doctorate in leadership from Southern Seminary, is the lead pastor at The Austin Stone Community Church in Texas. Peck also serves as the Director for Emerging Regions for the Acts 29 Network.

The authors open *Designed to Lead* by engaging this question: “Where is the leadership locus in your community?” and they seek to show that the local church ought to be a primary leadership locus in every community (p. 1). Their conviction is that the church is particularly commissioned and equipped to call and develop leaders in all spheres of life. The way that churches can systematically see that leaders are developed is by establishing constructs in the context of a leadership culture that

grows out of a strong conviction that all people are called to leadership. It is along those lines that the book is divided into three sections: conviction, culture, and constructs.

Part one lays the foundation for a biblical and theological conviction for leadership development in the context of the local church. They ground their convictions in frequent exegeses of Scripture, affirmations of the priesthood of all believers and the *imago Dei*, and the counter-cultural nature of the Kingdom of God. They insist that apart from a robust biblical and theological conviction for leadership development, the congregation will not sense the urgency and empowerment that the Bible describes.

The second section defines church culture and describes how it is formed and changed. Geiger and Peck define culture, not as the “vibe” of a church, but as “what we truly believe and value over a sustained period of time” (p. 129). They show that the stated beliefs of a church do not necessarily find expression in behavior, and that managing the culture of a church is a function of the pastors (p. 130). Therefore, one of the roles of pastors in the church is to guide the “whole church to purity in doctrine and in deed” (p. 131). To do this, leaders must influence the foundational beliefs of a church and create avenues for their expression (p. 141).

The final section on constructs is likely what most readers are seeking when they pick up the book. The authors realize this and offer a thoughtful encouragement not to implement leadership constructs without first laying the groundwork of biblical convictions and establishing a culture that is prepared to embrace the construct. They advocate two constructs: the leadership pipeline and the leadership pathway (p. 186). The leadership pipeline is a big-picture layout of leadership roles focusing on the congregation as a whole, and a leadership pathway is a description of role-specific competencies for each individual to pursue.

The book has much to commend. The authors consistently call the readers back to the centrality of the gospel for the life and ministry of the church and take frequent stops to remind the reader that leadership development is not the primary function of the church—worshiping the Triune God is primary. Another strength of the book is how the authors envision that the leaders developed by the church are called to bless and serve and influence spheres of life beyond the church’s doors. They speak often of this calling, stating that “up to 70 percent of leadership is completely transferable to any domain” (p. 177).

I believe the authors achieve their purposes for the book in chapter 8 entitled “Pipelines and Pathways.” This single chapter contains the practical implementation of their argument. They explain that the church must do more than envision leadership and discipleship; the church “must also provide steps or opportunities for people to mature and develop as leaders” (p. 181). The authors are effective in clearly presenting a baseline plan for the implementation of leadership constructs. One principle that is emphasized is the necessity of written competencies that pastors

desire to see developed in individuals in ministry positions. It is important that each level of leadership has competencies that are specific to that role (p. 195). This principle alone could impact the leadership culture of a church because each person has clarity regarding responsibilities and has a defined path for growth.

However, the book is not without its weaknesses, perhaps the chief being the confusing distinction between how the authors use the terms *leadership* and *discipleship*. Early in the book they state, “If you are His, you are designed to lead” (p. 4), but it is not until chapter seven that they describe the difference between general discipleship and leadership development. To be fair, their distinction is legitimate, for they write that leadership development is a subset of discipleship, or “advanced discipleship” (p. 153). This lack of clarity on the front end leaves the reader confused throughout most of the book as to what kind of leadership is being advocated and for which members of the congregation.

The authors spend the first three-quarters of the book laying the theological and ecclesiological foundations for implementing leadership development constructs; however, when the reader finally gets to the constructs section, there is a desire for more—more application, more troubleshooting, more examples. Beyond that, the reader wonders how these forms of constructs avoid painting the picture of the church as a corporation rather than the church as a body (1 Corinthians 12:27). The authors recognize this tension: “You don’t want to send the signal that success is progression through the pipeline. The goal of the pipeline is development, not progression” (p. 197). Nevertheless, church leaders seeking to implement Geiger and Peck’s model will have to wrestle with this “climbing the corporate ladder” mentality.

From start to finish, the book is a practical and accessible tool for helping men and women grow in leadership ability both inside and outside the church. This book is a welcome contribution to the field of church leadership because it advocates a theologically grounded construct for leadership development. There is a fear that leadership books simply offer another gimmicky framework that can work for a short time, only to be replaced by the next trend in leadership education—everybody becomes confused, and perhaps cynical. This is not that sort of book. This book is written by pastors with significant influence and experience in the development of leaders, and it is intended to serve as a guide for other pastors to incorporate the constructs in their own churches. Geiger and Peck succeed in creating an accessible entry point into the area of leadership and coaching which I expect pastors and church leaders will read and discuss together. Church leaders and students from all denominations ought to read and engage with this book because of its high esteem of the local church for developing leaders who will serve both within the church and without.

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**Anderson, Garwood P. *Paul's New Perspective: Charting a Soteriological Journey*. Downers Grove, Ill: InterVarsity Academic, 2016, pp. 439, \$45, hardback.**

Garwood Anderson, professor of New Testament and Greek at Nashotah House Theological Seminary, makes a strong case for what other scholars have suspected—namely, that Paul's own perspective on salvation expanded as evidenced by differences between his earlier and later letters. This is why the so-called “new perspective on Paul,” championed by E. P. Sanders, James D. G. Dunn, and N. T. Wright, makes good sense of Galatians, but the old Lutheran reading still has explanatory power for Romans and Philippians (pp. 12-13). “The argument of this book insists that both ‘camps’ are right, but not all the time” (p. 5). The clever title, *Paul's New Perspective*, refers to the so-called old perspective on Paul that comes late in his writing. But Anderson suggests that the motif and mystery of union with Christ is large enough to encompass the development.

The argument moves in three stages. Chapters 1—3 contextualize the debate for the reader. Anderson acknowledges not being a “Pauline specialist,” (VIV), but he engages a large swath of the secondary literature. He also focuses on three passages that do not fit entirely into either view: Philippians 3:1—22, Romans 3:21—4:8, and Ephesians 2:1-22. (Unlike some studies, he includes the whole Pauline corpus. Even if Ephesians, Colossians, and the Pastorals were not written by the apostle, they reflect the trajectory of his thought.)

Chapters four and five place Paul's letters in chronological order. Anderson opts for the early dating and southern hypothesis for Galatians. Then follow the letters to the Thessalonians, Corinthians, Romans, and Philippians. He accepts Philemon, Ephesians, Colossians, and the Pastorals as Pauline, although they are more difficult to place in Paul's ministry (especially as related in Acts). The thirteen letters of the Pauline corpus were dispatched over a fifteen year (or so) process. This would allow space for Paul to develop (refine, unpack) his understanding of the gospel.

Chapters six through eight are exegetical. The New Perspective on Paul helpfully contextualized Paul's language “works of the law” in Galatians (2:16; 3:2, 5, 10) to refer to boundary markers separating Jews and Gentiles like circumcision and the festal (Sabbath) calendar. The Galatians were not trying to earn their way to heaven, but to be found acceptable by influential, Jewish teachers. However, this background is too narrow for “works” at Ephesians 2:9. Already in the expansive argument of Romans we see a universalizing of the problem of approaching salvation as a wage (4:4-5). Participation in Christ is a “red thread,” but we see a developing interest for even cosmic reconciliation (Rom 8:18-30; Col 1:15-20).

I recommend the same chronological order to my students and am sympathetic to his conclusions, especially his emphasis on union with Christ and the need for interpersonal and cosmic reconciliation, which the church and the rest of creation are

groaning after. Justification is part of Paul's toolkit for constructing his soteriological vision, but it is not the center. My esteemed professor Ralph P. Martin (1925 – 2013) insisted reconciliation was a better core.

For those who hold a high view of Scripture, there may be value in considering development in Paul's thought. In his earlier letters, the apostle focuses on the imminent return of Christ: "we who are alive, who are left, will be caught up together" with those who died but Jesus resurrected (1 Thess 4:17 ESV, emphasis added). But in his later correspondences, Paul looks forward to departing, a euphemism for death, and being with Christ (Phil 1:23). Presumably, in light of his imminent martyrdom, the apostle was resolved that Christ might come after his generation. In 1 Corinthians, Paul counsels against remarriage for the widowed (7:26-27). However, in 1 Timothy he recommends the opposite: "I would have younger widows marry . . ." (5:14 ESV). Apparently, there were too many widows being financially supported by the church in Ephesus, and so the list had to be shortened. These, I suggest, are not contradictions, but reflect the shifting circumstances of Paul's life and ministry.

Anderson, I believe, is partially correct when he insists that Paul's letters are "contextually determined" (p. 6). But we should note a Protestant bias here. The Christian tradition has viewed God as the ultimate author of Scripture. There is value in attempting to retrieve the intent of the human author, but we should recognize the challenge. Did Paul's thought develop, or did the rhetorical situation shift from having to defend himself against Pharisees in his earlier letters (see Acts 15:5), who were preoccupied with boundary markers, to the more universal problem of hubris in his Greco-Roman social world? Is human reasoning the primary variable, or is Paul's spirit ultimately sounding off the mind of Christ?

The idea of development in Paul's letters is a very old debate. I doubt *Paul's New Perspective* will settle the matter, but I hope it becomes a significant conversation partner. It would serve well in a master's level course on Pauline soteriology.

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**Gilmour, Rachelle. *Juxtaposition and the Elisha Cycle*. LBHOTS 594. New York/London: Bloomsbury, 2015, pp. 250, \$110, cloth (\$26, e-book).**

Rachelle Gilmour is Lecturer in Biblical Studies at the Broken Bay Institute in Sydney. She earned her Ph.D. in Hebrew Bible from the University of Sydney and spent time at both the Hebrew University and University of Edinburgh as a postdoctoral fellow. During her time at the Hebrew University, she wrote the monograph *Juxtaposition and the Elisha Cycle*. Gilmour has written broadly regarding literary analysis in the Former Prophets, with most of her work focused specifically in Samuel and Kings.

Gilmour contends that a gaping hole exists in Old Testament literary critical studies around what she considers to be an essential tool of the writers of the Hebrew

Bible, namely, juxtaposition. Juxtaposition is the deliberate, redactional selection and arrangement of scenes, episodes, and even whole narratives, next to other units with the intent to guide the reader to a different interpretation than one would discover if a unit was read independently. To correct this problem, Gilmour provides in this monograph a theoretical framework for interpreters of the Hebrew Bible to understand juxtaposition of narratives as a critical part of the hermeneutical task.

She arranges the book into three parts: methodology, application, and concluding remarks. In part A, Gilmour critiques both diachronic criticism's pragmatic explanation of juxtaposition as well as literary criticism's insufficient utilization of juxtaposition as a tool to explain the text only when contradictions of chronology or ideology exist in the text. Instead, she points to clear inner-biblical allusions, as well as 2<sup>nd</sup> Temple rabbinical hermeneutical practice, to show that juxtaposition is a legitimate and important hermeneutical lens for the writers of the Hebrew Bible. Thus, arrangement of the juxtaposed elements is itself a hermeneutical process that can change the interpretation of whole narratives. She maintains, "Attention to juxtaposition is not merely a method for explaining particular discontinuities in biblical narrative but is a principle of interpretation for all narrative" (p. 18).

After establishing her argument for the need of a proper framework for understanding and analyzing this phenomenon, Gilmour (following rabbinic tradition) suggests analyzing the two ways the writers of the Hebrew Bible utilized juxtaposition: chronological and non-chronological interpretation. Literary units that are primarily juxtaposed together based on chronological sequence build a plot that points the reader to interpret a cause-effect relationship, but they can also be juxtaposed for background information.

Gilmour applies Bakhtin's literary approach of Dialogism to non-chronological juxtaposition. Dialogism is truth expressed via multiple voices through interaction and discussion rather than by one person. Non-chronological units can be juxtaposed to create a dialogue between units of contradiction, corroboration, or question and answer. Since non-chronological units do not have a cause-effect relationship, the dialoguing connections between units must be found in repeated words or phrases, parallel plots and narrative analogy, or *Mise-en-Abyme* (a story embedded in the narrative that contains the plot of the larger narrative in microcosm). Finally, Gilmour clarifies how to discern continuity (chronological sequence) and discontinuity (non-chronological sequence) in the narrative.

After laying the foundations of her methodological framework, she applies this approach to the Elisha cycle in Part B. Gilmour assumes a putative redaction history, with two separate collections of Elisha stories with other smaller stories added after being brought together with the Elijah cycle, which "...will demonstrate how the interpretation of episodes can be transformed when placed in a new context, even if we are not able to describe with complete accuracy the process behind the formation of the Elisha cycle" (p. 73). Gilmour then proceeds episode by episode in the Elisha

cycle, starting in 1 King's 19:19-21, and compares the interpretation of each episode by itself, then when juxtaposed with the preceding passage, subsequent passage, and putative original position in pre-existing collections to demonstrate the significance of the author's choice in juxtaposing units.

In the final section, Part C, Gilmour concludes her monograph by applying the Bakhtinian criteria for dialoguing voices (corroboration, contradiction, and question and answer) to the task of the interpreter rather than the original author(s). Paying attention to juxtaposition as a hermeneutical lens helps explain the function of strange stories and details that, when read independently, seem irrelevant or inexplicably inappropriate (such as the episode of Elisha, the 42 boys and the mauling by bears). Additionally, an awareness of the intentionality of juxtaposition aids in identifying the focus of an episode and in clarifying ambiguous situations. With the Elisha cycle particularly, Gilmour demonstrates how utilizing this approach presents a fresh analysis of these narratives leading to a more complex and nuanced appreciation of Elisha, the Elijah cycle and Jehu narratives, as well as their placement and function in the book of Kings.

*Juxtaposition and the Elisha Cycle* is a helpful and badly needed resource for Old Testament literary criticism; yet more work remains to be done as Gilmour's work is only applied to the Elisha cycle. For those who have a working knowledge of Hebrew as well as an introductory level understanding of Old Testament literary criticism, Rachelle Gilmour's sections on a methodological framework for juxtaposition (Part A) and concluding remarks on its usefulness to biblical narrative (Part C) are critical and her argument needs to be considered. Many pastors and most lay leaders, however, will not find this book accessible, as its cost and subject matter might prove too esoteric to be immediately beneficial. This monograph is not a commentary-type resource on 2 Kings which most preachers or Sunday School leaders could reference in weekly preparation. Nevertheless, I recommend this resource to any biblical studies student who desires to either study the Elisha cycle specifically or the literary phenomena and hermeneutical strategy of juxtaposition generally.

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**Schaeffer, Francis. *Joshua and the Flow of Biblical History*. Wheaton, Illinois: Crossway, 2004, pp. 223, \$19.99, paperback.**

Francis Schaeffer was the founder and director of the L'Abri community in Switzerland. He became famous for his hospitality and intellectual discussions centering on the place of the historic truths of the Christian faith in the midst of a changing European worldview. He authored more than 20 books before his passing in 1984, including *Joshua and the Art of Biblical History*, reprinted in 2004.

Schaeffer's work is an attempt to discuss the major events and characters in the book of Joshua within the context of the larger biblical narrative. As a result, he begins his study with Joshua's place within the Pentateuch and the lessons he received at the feet of Moses (pp. 15-36). Then, he discusses some "changeless" factors of leadership that influenced Joshua's life (pp. 40-48). This pattern, consisting of highlighting passages from Joshua, making connections from Joshua into other biblical narratives (including, especially, New Testament ones) and discussion ethical or moral lessons learned from the story of Joshua continues, whether it be the idea of eating before the divine and its relationship to Communion (p. 10), the circumcision of the Israelites prior to the Jordan crossing and Paul's teaching on circumcised hearts (pp. 104-7), a comparison between Achan and Sapphira (pp. 123-4), a discussion on Caleb and his relevance to the fruit of the Spirit (pp. 168-170), or an analysis on how the division of the land points to the supremacy of Christ (pp. 173-8). Schaeffer focuses on the moral implications of Joshua's era and its biblical-theological consistency with the rest of the Scriptures. As a result, the book, while rigorous and filled with clear and precise thought, is not necessarily scholarly or heavily researched. This is not a fault with the book; Schaeffer's work deserves to be judged on how it met its intended aim, not on whether or not it meets its readers expectations of what that aim should be. Readers, however, should be aware that there is a minimum of reference to outside scholarship or engagement with the larger critical discussion surrounding ideas like biblical history or biblical theology.

When Schaeffer does discuss biblical history in an academic sense, it is often against an implied "liberal" opponent. As such, Schaeffer reasserts the foundational importance of propositional truths as a bedrock of faith (p. 82) and of salvation as an act of the will in the cognitive region of the mind (p. 86). He continually emphasizes the existence of a written, normative, canonical Pentateuch in Joshua's day (pp. 35, 172), going so far as to compare the Israelites in Joshua's time to "Bible-Believing Christians" (p. 38) since both groups are receivers of inspired books. Schaeffer expects his readers to share these presuppositions, only offering a few reasons why his conservative positions are the best conclusion, such as the "we" passages in Joshua 5 (p. 42).

Taken as an introduction to the biblical account of Joshua and its impact on the Christian life, this book is incredibly useful. When read as an Old Testament scholar would read a text on "biblical history," this volume seems to fall short in its use of precise terms and engagement with the wider scholarly conversation. Two examples of this practice should suffice.

The titular "Flow of History" in Schaeffer's meaning seems to be that "biblical events actually happened in space time." As Schaeffer discusses the events on Mount Ebal and Mount Gerizim, he states that "space-time history had already begun to weave a web around this place" (p. 128). He reminds readers that Abraham, Jacob, Joseph, Jesus, and even Justin Martyr encountered that place and brought various

revelations to God's people there. Similarly, Schaeffer posits that history is heading towards an end-point rather than engaged in a cyclical drift. (p. 174)

This approach seems very similar to the salvation-historical readings of the Old Testament (*heilsgeschichtliche*). Given such broad areas of agreement, one wonders why Schaeffer doesn't explicitly engage this school of thought, or even opposing schools of thought, such as a more Bultmannian approach to the text. For better or worse, Schaeffer is committed to building a literal, biblical case for his ethical and moral conclusions rather than in contributing to biblical scholarship in these areas.

Another important aspect of Schaeffer's conception of the biblical "flow" of history is that of continued disobedience to moral law. Schaeffer compares the condition of the ancient Israelites to that of rubbing one's hand against a rough, wooden board and coming away with splinters. In the same way, when either the ancient Israelites or modern persons act against the grain of how God set up the universe, there are consequences to those actions. (pp. 140-3) As result, Schaeffer is not clear whether history is primarily meant in the sense of "these things happened" or "these things continue to matter." Instead, there is some conflation between issues of biblical history and biblical theology. His interest is not primarily in determining how events happened (what some would call biblical history). Nor is it in determining the full scope of what the biblical literature teaches on a subject (what some would call biblical theology). Nor, even, is it solely on determining what lessons the book of Joshua has for modern readers (what some might call a devotional approach). Rather than proceeding from confusion or imprecision, however, this conflation is a result of his worldview: the acts recorded in the Scripture actually happened (history) and therefore have incredible importance for people today (theology). It is not inconsistency as much as it is insistence. One suspects that if Schaeffer's categories and methods departed from those of the academy, he would find that a mark in his favor and not a problem to be corrected!

If a student is interested in a model for how to work from text to concept while keeping the broader biblical text in mind, Schaeffer's work is an excellent starting point. If, on the other hand, a student is interested in a technical introduction to issues of biblical history, biblical theology, or the text of the book of Joshua, then he or she should consult another resource. *Theological Interpretation of the Old Testament*, edited by Vanhoozer, is a valued resource for biblical theology, while *Joshua: An Introduction and Commentary* by Richard Hess serves as a source for textual commentary and technical issues. All readers, though, will find Schaeffer's passion for the text and affirmation that the biblical text still speaks today inspiring and invigorating, whether as an encouragement to their own beliefs or as a sparring partner against which to set their own worldview.

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**Robertson, O. Palmer, *The Flow of the Psalms: Discovering Their Structure and Theology*, P&R Publishing: Phillipsburg, NJ, 2015.**

O. Palmer Robertson is the director and principal of African Bible University in Uganda. He previously taught at Reformed, Westminster, Knox, and Covenant seminaries. He has authored such works as *The Christ of the Covenants* and *The Christ of the Prophets*.

The Psalms appear to be a haphazard collection of prayers and praises. Robertson argues, however, that the Psalms showcase a deliberate structure at the hands of their final redactor. Because the Psalms developed over a long period of time, the final redactor selected certain psalms for certain locations (p. 7). By discerning this structure, one may see how the Psalms connect with each other and gain insight into each Psalm (p. 3).

He notes the Psalter divides into five books, each of which ends with a doxology (p. 8). He identifies already extant Psalm collections (p. 10). Next, he observes how the redactor distributed different authors throughout the Psalter. For example, Davidic Psalms dominate Books I and II, but their number diminishes in Books III–V. The redactor also positioned significant Psalms at the literary seams: Psalm 72 by Solomon concludes Book II, and Psalm 90 by Moses begins Book IV. These placements suggest deliberate choice rather than haphazard assembly.

Robertson then identifies the two “poetic pillars” which introduce the Psalms: Psalms 1 and 2. These two Psalms—a Torah Psalm and a Messianic Psalm respectively—summarize the main themes of the Psalter: God’s law and God’s king/Messiah. According to Robertson, a Torah Psalm appears with a Messianic Psalm three times in the Psalter; each time at a pivotal point (p. 16).

Next, he discusses minor structural markers: the placement of the acrostic Psalms (p. 16), the groupings celebrating the kingship of Yahweh and His Messiah (pp. 16–17), the Psalms of Ascents (p. 17), Psalms of Historical Recollection (p. 18), Focal Messianic Psalms (pp. 18–19), Psalms Confessing Sin (p. 19), “Poetic Pyramid” Psalms (p. 19), and the Hallelu-YAH Psalms (p. 20). He devotes less space to these markers in the beginning of the book, although he handles them in more detail during his exegesis. Robertson concludes this overview, stating, “Taken together, these various groupings just listed account for a large segment of the Psalter. Other groupings or interconnections bind the entire book of Psalms into a well-organized composition (p. 21).”

In the following chapter, Robertson considers the redemptive historical framework of the Psalms. He applies his work from *The Christ of the Covenants* to the structure of the Psalms. He emphasizes the role of the Davidic covenant in the Psalms, although themes from prior covenants appear as well. He presents the macro-structure of the Psalms in chapter 4. In the remainder of the work he explains the structure of the Psalter Psalm by Psalm.

Robertson argues convincingly for a deliberate structure and flow for the Psalms. Through his exegesis, he delineates how the Psalms connect on a macro and micro level and how these connections communicate the Psalter's message.

One connection comes in Book I. Robertson observes that Psalms 3–17 show the Messiah's (David's) struggle to overcome his enemies and establish his throne. Psalm 18 is a turning point. The superscription indicates that David wrote this Psalm after he had been delivered from the hand of Saul. However, previous Psalms (e.g., Psa 3) depict events after Saul's death. Robertson thus observes the redactor's hand. The redactor considered thematic and theological factors above temporal or historical factors when he arranged these Psalms, showing the establishment of Messiah's throne through mortal combat with his enemies. Although conflict continues to reign, the tone of Book I changes after Psalm 18. The king must still fight, but he now enjoys a modicum of stability (p. 78). Significantly, this change in tone occurs at the second Torah/Messiah Psalm pairs.

Also, Robertson demonstrates a connection between the themes of Books I and II. The focus changes from the king's conflict with God's enemies to his communication with them. Robertson shows that the Psalmist, though still engaged in conflict, now addresses the nations. For example, Psalm 67 uses Elohim when it cites the Aaronic benediction (p. 113). Such an address does not appear in Book I. Since the Psalmist now addresses the nations, he uses Elohim instead of YHWH. Robertson shows that Book I consistently uses YHWH while Book II uses Elohim. Old Testament scholars have noted that the biblical authors frequently use Elohim when they intend their message for non-Israelites. These lines of evidence strengthen Robertson's overall argument.

Robertson makes a strong connection between Books III and IV. At the end of Book III, the Davidic covenant and monarchy have apparently failed. Since the Davidic covenant plays such an important role in the Psalms, the Davidic failure casts a pall over YHWH's promises. In this context, Robertson observes that Book IV begins with the only Psalm of Moses. This Psalm returns to the beginning of Israel's history and YHWH's rule then, before a king ruled in Israel. This Psalm proceeds to the "YHWH Reigns" collection. Robertson again sees the redactor's hand. The redactor placed these Psalms in this order to show that YHWH has always been Israel's king, whether the Davidic king proved faithful or not (p. 147). Through this placement, the redactor shows that Israel's faith has matured. Robertson's observation illuminates both the location of Moses's Psalm and the purpose of the "YHWH Reigns" collection.

Robertson bolsters his case by appealing to the New Testament's use of the Psalter. The New Testament authors quote certain Psalms more than others, and Robertson observes that the most popular Psalms appear at key junctures within the Psalter. For example, Psalm 110 and Psalm 118 bring the Messianic focus to a climax in the Psalter, and New Testament authors quote these Psalms, along with

Psalm 2, more than any other Psalm (p. 195). Psalm 118 also appears in the final Torah/Messiah Psalm pair. While not all will accept Robertson's appeal to the New Testament for verification, he has illumined the surrounding context of every Psalm quotation in the New Testament through his study of the structure. Those who study the use of the Psalms in the New Testament should find a reliable foundation for their work in Robertson's study.

Although Robertson interacts with different Psalms scholars, he maintains a theological and pastoral focus throughout the book. He argues that one can memorize a large portion of the Psalter by understanding the overall structure and flow (pp. 81–82). Throughout the book, he derives various lessons about prayer from the Psalms. These pastoral insights make this study useful beyond the academy.

*The Flow of the Psalms* will serve well as an overview of the Psalter. Its contents will initiate Old Testament students into the interpretation of the Psalter. Its pastoral insights will help pastors preaching through or counseling from the Psalms. Educated laypeople will find this book helpful and edifying.

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**Lau, Peter H. W. and Gregory Goswell. *Unceasing Kindness: A Biblical Theology of Ruth*. New Studies in Biblical Theology 41. Downers Grove, IL: InterVarsity Press, 2016, pp. 212, \$24.00 paperback.**

Peter H. W. Lau and Gregory Goswell collaborate in a recent addition to the series New Studies in Biblical Theology, *Unceasing Kindness: A Biblical Theology of Ruth*. Peter H. W. Lau is Lecturer in Old Testament at Seminari Theoloji Malaysia and is an honorary research associate at the University of Sydney. Gregory Goswell is the Academic Dean and Lecturer in Biblical Studies at Christ College, Sydney.

In writing *Unceasing Kindness* Lau and Goswell do not intend to compete with commentaries, nor to “render them superfluous” (p. 157). Rather, the authors seek to build on “close studies of the text” provided by commentaries in order to explore “its biblical-theological parameters” in the context of the whole of Scripture (p. 157). Lau and Goswell begin by reading Ruth alongside various texts in the Old Testament, drawing out themes found when Ruth is read in conjunction with other books of the Old Testament. The authors first read Ruth alongside Ezra-Nehemiah, seeking to understand how Ruth informed the readers of the “early restoration period” of Israel's return from exile. Lau and Goswell then read Ruth in light of the various canonical positions Ruth is found: Ruth's position between Judges and 1 Samuel (as in the LXX); Ruth's position after Proverbs (as in the Masoretic Text); Ruth's position before Psalms (as found in a canonical list in the Babylonian Talmud tractate *Baba Bathra*). In the last four chapters, the authors flesh out four themes found in

Ruth and in the whole of Scripture: famine, God's sovereignty and human agency, redemption, and mission.

Overall, Lau's and Goswell's work is an excellent resource for understanding the book of Ruth. The authors masterfully cover a wealth of information without overwhelming the reader. For example, Lau and Goswell skillfully critique Roger Beckwith's arguments concerning the order of the Old Testament canon. The authors provide the reader with the essence of Beckwith's dense argumentation without sacrificing his meaning (pp. 55-58). Throughout the book, Lau and Goswell clearly argue their positions and plainly elucidate the themes of Ruth.

Particularly illuminating are Lau's and Goswell's contention that Ruth should be read in the contexts of its various canonical positions. The authors maintain that the placement of Ruth in different positions in the canon "reflect the varying perceptions and evaluations of later generations of readers . . . and no one canonical position need be privileged above the others" (p. 22). Lau and Goswell emphasize that reading Ruth in different canonical places will not necessarily produce "wildly different" or contradictory readings, but will lead to "fresh interpretative insights" into Ruth (p. 38). The authors appeal to a phenomenon called 'paratext'—coined by Gérard Genette—by which a text is "in large measure dependent on its context" (p. 37). A biblical book, therefore, is dependent on the context of the other books surrounding it (p. 37). Because in the history of interpretation, Ruth has been placed in differing canonical positions, Ruth "has been read in more than one context" (p. 37).

Whether or not one agrees with Lau's and Goswell's understanding of paratext, the themes the authors flesh out when Ruth is read in its different canonical contexts are very insightful. When Ruth is positioned between Judges and 1 Samuel, the events in Ruth are best understood as preparation for the Davidic dynasty. Furthermore, God's care and provision of David's family in Ruth anticipates the same care in the lives of David and his house (p. 35). When Ruth is read after Proverbs, Ruth is seen as a model of "key aspects of the wisdom ethic of Proverbs" (p. 52). Lastly, when Ruth is read before Psalms, Ruth is viewed as a "model of piety in the same variety" as her descendant David, who composed many of the psalms (p.70).

Readers may not agree with all of Lau's and Goswell's conclusions on some matters; for example, the authors' view of God's seeming absence in the book of Esther (pp. 97-102), and the authors' explanation of Boaz marrying a Moabite woman in light of the prohibition in Deuteronomy 23:3 (pp. 146-49). However, these matters do not detract from the themes Lau and Goswell flesh out in the book of Ruth.

Series editor D. A. Carson notes in his series preface that the contributions to New Studies in Biblical Theology series are "creative attempts to help thinking Christians understand their Bibles better" (p. ix). To this end Lau and Goswell have succeeded. The authors write with clarity and their arguments are easy to follow. The book could serve as a required text in a seminary class or as a study book for a church group. While the book could serve the needs of a church study group, some level of

biblical literacy is helpful in moving through *Unceasing Kindness*. In one's personal study, Lau's and Goswell's book could also be used in conjunction with a verse-by-verse commentary, with *Unceasing Kindness* providing the reader with the bigger picture of how Ruth fits in the scheme of the Old Testament and the whole Bible. Overall, Lau's and Goswell's work is strong with much to commend it.

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**Whitney, Donald S. *Family Worship*. Wheaton, Illinois: Crossway, 2016, pp. 80, \$7.99, paperback.**

Recent publications indicate a growing interest in the spiritual discipline of family worship. Families and Christian leaders are realizing that outsourcing the Christian discipleship of their children is neither effective nor a fulfillment of God's plan. Don Whitney (DMin, Trinity; PhD, University of the Free State) is well qualified to contribute his voice to this important topic. He serves as associate dean and professor of biblical spirituality at The Southern Baptist Theological Seminary. He also founded and currently serves as the president of The Center for Biblical Spirituality. He served in pastoral ministry for twenty-four years and has written numerous books on spirituality and spiritual disciplines.

*Family Worship* provides a brief introduction to the practice of family worship. With the first two chapters, the author builds the case for why families should regularly practice family worship. Chapter one surveys the Biblical record for examples of and instruction in family worship from Abraham to Peter. Chapter two calls on the saints throughout church history to give their teachings and testimonies concerning family worship.

The next two chapters provide practical instruction on how to implement family worship. Chapter three covers the elements of family worship. Family worship includes three simple steps: read, pray, and sing. Additional elements such as catechism, memorization of scripture, and reading other books can be included for families who want to spend more time in family worship, but these additional elements are not vital. Chapter four guides families whose circumstances may raise questions on how to practice family worship (e.g. "what if the father is not a Christian?" or "what if the children are very young?").

The final chapter, "Isn't This What You Really *Want* to Do?" is motivational. It begins by stating many of the benefits of regular family worship. It includes further motivational examples of faithful family worship leaders, one each from three sources: scripture, church history, and contemporary illustration. It concludes with two final admonitions. First, families must be resolved. They must rely on the power of the Holy Spirit to give strength for the task no matter the situation. Second, they must remember the gospel. Family worship does not make one right with God. Family

leaders must apply the gospel to their own hearts before they can hope to apply it to the hearts of their families.

Don Whitney has written an excellent introduction of the vital practice of family worship. Multiple factors make this an excellent introduction. First, the book is also exegetically sound. Dr. Whitney searches the Scriptures for the principle of family worship. He is careful not to force more out of a text than what is in it. Nor does he put into a text what is not there. He simply highlights characters and teachings throughout the Scriptures that model or teach the principle of family worship.

Second, the book is short. Some may want more exegesis of Scripture or more explanation of methods, but the primary benefit of this book is that it is accessible to a wide range of people. Busy pastors, seminary students, and Christian lay people will all find it useful as an introduction to family worship.

Third, Dr. Whitney provides the proper motivations to begin or to continue practicing family worship. Whitney presents dual motivations for family worship. The first benefit is the worthiness of God for worship. This is obvious and cannot be overlooked. The second benefit is the blessings to the family. This motivation may be overlooked because family worship is often seen as an inconvenience rather than a benefit. But Whitney uses testimonies throughout the book of families who have been drawn closer together because they worshipped together in their homes.

Another strong point of the book is its survey of what church leaders throughout history have said about family worship. This survey, while necessarily brief, adds to the weight of the argument for family worship. Christians should be encouraged and challenged to practice family worship when they see that it has been a regular part of the practice of the Church from the beginning.

Finally, the book excels as a manual of practice for pastors who want to teach family worship and for families who want to learn family worship. The method of family worship that is presented is simple. Almost any family can find a few minutes every day to read the Bible, pray together, and sing. No one needs to prepare a lesson. The family just needs to gather together to read, pray, and sing. Family worship is simple and accessible. Even the additional components of family worship that Dr. Whitney introduces, such as catechism, scripture memory, and reading other books can be done without demanding inordinate amounts of time from families.

Pastors and families who want to teach or learn family worship are reminded of three pieces of advice. First, be brief. This is wise especially for families with younger children. Second, be regular. False starts and inconsistency in family worship can frustrate a family. Regularity will form habit and appreciation. Third, be flexible. Families can and should work together to find what works for them.

Many pastors and families will also find the chapter on unusual situations to be very helpful. Dr. Whitney has recognized the reality that many families will find family worship difficult or even awkward based on their unique situations. He has



provided an excellent resource in this chapter for pastors who need to counsel families through these situations or for families who face them.

*Family Worship* is an excellent introduction to the practice of family worship. As a brief introduction, it does not answer every question on the topic. But it does give the student a good start in learning the importance and practice of family worship. It could easily be used as a textbook for a class on the Christian home or as a resource for lectures on the family life of a minister. The book is not aimed at the academy, yet biblical-theological students would do themselves a great disservice to ignore this book. It will equip them to lead worship for their own families and to model and teach family worship to those whom they will serve in the ministry.

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**J. Gordon McConville. *Grace in the End: A Study in Deuteronomistic Theology*. Grand Rapids, MI: Zondervan, 1993, pp. 176, \$18.99, paperback.**

J. Gordon McConville serves as Professor of Old Testament Theology at the University of Gloucestershire and as external examiner for Queen's University, Belfast, where he earned his PhD.

In *Grace in the End*, McConville seeks to “characterize Deuteronomistic theology on the basis of secure literary, historical and theological criteria” (p. 11) by closely examining the limitations of recent historical-critical approaches to the message of Deuteronomy and its relationship to the rest of the OT canon, especially the Deuteronomistic History (DtH). He contends, specifically, that these scholars failed to capture the nuance of Deuteronomistic thought because they polarized aspects of its message, such as separating law and grace, into “rival views vying to be heard” (p. 123) without accommodating its desire to unite them into its “distinctive concept” (p. 123). This concept becomes, for McConville, the OT’s “true formative influence” (p. 11). because it holds together “a theology of God and Israel on the plan of the nation’s entire history” (p. 123). In this work, McConville provides a thorough testing of his historical-critical predecessors and their various models and conclusions by examining the implications of their historical and literary assumptions on a subject that defies simple descriptions of its setting, origin and theological message. These scholars, in general, have sought to hold together Deuteronomistic thought’s “theological elusiveness” (p. 15) by dividing its aspects into competing and conflicting sides that develop diachronically. McConville, however, proposes expressing Deuteronomistic theology’s concept in five categories by defining God as King (pp. 124–5), the words of Horeb as present and needed in every generation (pp. 125–8), the real intervention of God into history that commands a choice from men (pp. 128–32), the good election of Israel into the promise

despite their sin (pp. 132–4), and the triumph of God’s grace in the end when Israel’s pending failure will become an eventual return to Him (pp. 134–7). While his thesis was ably proven, the brevity of the work left key unanswered questions about his own methodology.

In chapter 1, McConville lays out his problem of how to describe the fullness of Deuteronomic theology, which extends beyond the pages of Deuteronomy itself, as an examination of both its “root and branches together” (p. 10). He sets the initial “lines of the debate” (p. 10) via the paradigms of Wellhausen and Noth, who find a Deuteronomic root that presents a pre-exilic perspective and a branch that reprocesses the same events via the exile. This chapter sets the tone for his other analysis because he cautions that these models might “unduly dominate” (p. 11). Deuteronomy. The conclusions may be more about the models than the actual biblical evidence.

McConville, then, in chapter 2 undertakes a descriptive exploration of the methods employed in Deuteronomic scholarship that exposes the various attempts to hold together Deuteronomy’s ideas through source, literary and transmission-history criticism. His even handed and insightful categorization shows the variety of polarities that different approaches take, such as 1) geographical, dividing northern interests from southern; 2) theological, separating law and gospel and 3) political, distinguishing pro-monarchy parts from anti-institutional pieces. His argument proves effective here because with each scholar’s preferred polarization to explain multiple ideas within the text, McConville offers its weakness that sets the stage for the next approach.

In chapter 3, McConville dismantles the various formal criteria that modern scholarship uses to date Deuteronomy to show that such analysis must be tested and “accompanied by arguments about content” (p. 60). That is, an exilic date and setting need not be the only condition to explain, among other features, the text’s perspective on the land, Israelite brotherhood, opposition to Canaanite worship, and the development of the altar law (pp. 45–55). Multiple moments of Israel’s history can reflect such concerns, and the biblical text itself does not clearly set that timeframe. His argumentation excels because his critiques of dating criteria renders mute critical scholarships conclusions of meaning.

In chapter 4, McConville zeroes in on the Deuteronomic idea in the Deuteronomistic History (DtH). It serves as the workhorse of his analysis because in it he reinforces the weaknesses of polarized approaches across an even larger corpus. Specifically, McConville considers the problems of DtH’s origin and the relationship of its parts to the whole (pp. 66–78) because these two concepts undergird much of the polarized methods. It is hard to overstate the power that this section holds for his argument because he demonstrates that polarized approaches miss the “subtle ironies of the literature” (84). They misread the text’s intuitive features. In so doing, he effectively sets his thesis as a plausible solution to its problem.

In chapter 5, McConville finally provides his own Deuteronomic theology by synthesizing its many ideas into five foundational concepts: God as Israel’s only worthy

King, whose relationship with Israel from the words of Horeb to the very end reveals God in all generations, making all of man's choices before God real and consequential. This surprising election of sinful Israel encompasses not only their pending failure and exile but also the eventual return to Him when God will circumcise their hearts because "the answer to Israel's infidelity lies in God himself" (p. 137), in the grace that prevails in the end (pp. 134–7). Despite this chapter's clarity, its brevity leaves the reader with many questions about his method and its implications. While the following chapters provide implications for the NT, McConville does not provide an effective link for his Deuteronomic concept to the texts before Israel's arrival at Sinai, especially lacking theological reflection on Gen 1–11. His excursions on Holy War (pp. 139–44) and the brief mention of the deliverance out of Egypt (p. 124) prove the closest he comes to these issues. His detailed examination of other scholars' methods invites a similar examination of his own. This almost anti-climactic shortcoming does not render his thesis as implausible, but it leaves the reader with a desire for more reflection.

In chapter 6, McConville extends the branches of Deuteronomic theology into the New Testament. His approach emphasizes the NT's common themes and ethical pleas from Deuteronomy.

Finally, in chapter 7, McConville concludes his work by framing its analysis as a response to "a basic question about the development of religious thought in Israel" (p. 158). While this ending underscores the power of his Deuteronomic concept, marking it applicable to all generations and a continuing discussion of God's relationship to Israel, it also returns to reader to questions over his methodology. Specifically, is his Deuteronomic concept a theology of the text or a theology of Israel's religion?

Nonetheless, *Grace in the End* provides a survey of modern scholarship that models charity, critical thinking and insight. He proves his thesis by showing the limitations of other approaches and offers his own solution in an effective manner. In particular, he captures the most significant aspects of Deuteronomy and holds them into a Deuteronomic theology that provides the basis for much of biblical theology. This book serves, therefore, as an effective introduction into modern scholarship on Deuteronomy and the Deuteronomistic History. It is an essential part of any scholar's attempt to do biblical theology rightly.

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**Hess, Richard S., *The Old Testament: A Historical, Theological, and Critical Introduction*. Grand Rapids, MI: Baker Academic, Jan. 2017, pp. 816, \$49.99, hardback.**

Richard S. Hess (PhD, Hebrew Union College, MDiv and ThM, Trinity Evangelical Divinity School, and a BA from Wheaton College.) is Earl S. Kalland Professor of Old Testament and Semitic Languages at Denver Seminary in Littleton, Colorado,

and editor of the *Denver Journal*. Dr. Hess has authored 9 books, edited or co-edited 33 books, and published more than 100 scholarly articles in collected essays and journals.

The title of the book “*The Old Testament: A Historical, Theological and Critical Introduction*” is a precise summarization of the contents. In the preface, Hess writes that “This book is designed to meet the needs of the broad variety of students who come to study the Old Testament at a seminary or at a graduate level. It does not presume a deep knowledge of the Scriptures, although I wrote it with the intent to inform any serious reader.” (viii). Hess brings together an articulate synthesis of the Old Testament based on his years of academic research and publications about manuscripts, translations, textual criticism, archaeology, theology and exegesis.

He states in the introduction that there is a threefold purpose: “(1) to explain the definition and structure of the Old Testament, (2) to provide essential guidance regarding the composition and manuscript evidence of the Old Testament, and (3) to orient readers to the study of the Old Testament, surveying the interpretive methods explored in the following chapters of this work.” (p. 1)

The book divides the Old Testament into the standard divisions of: 1) Pentateuch, 2) Historical Books, 3) Poetic Books, and 4) Prophetic Books. Each chapter is devoted to a single Old Testament book (except 1-2 Samuel, 1-2 Kings and 1-2 Chronicles in which each are treated as a single volume). Each discussion of a biblical book is organized into five major components: 1) Name; Text; and Outline, 2) Overview, 3) Reading, 4) Theological Perspectives, and 5) Key Commentaries and Studies.

The first major component is divided into three subheadings. The first subheading (Name) provides an explanation of the origin and meaning of the name of the book. The second subheading (Text) provides a summarization and comparison of manuscripts (e.g. Masoretic, Septuagint, Dead Sea Scrolls, Latin Vulgate). The third subheading (Outline) provides a succinct, concise and descriptive outline of the literary segments of the book.

The second major component (Overview) provides a summarization of the book based on the author’s outline. The overview is primarily an encapsulation of the contents with few interpretive comments. The reader may find minimal help in regards to an explanation of meaning of the text.

The third major component (Reading) has seven subsections: 1) Premodern Readings, 2) Source Criticism, 3) Tradition History, 4) Literary Readings, 5) Gender and Ideological Criticism, 6) Ancient Near Eastern Context, and 7) Canonical Context.

Premodern Readings provides a survey of major expository commentaries from various periods prior to the 20<sup>th</sup> century. The focus is on primarily Jewish and Christian authors (e.g. Mishnah, Talmud, Patristic, Rabbinic, Reformation).

Source Criticism (labeled Higher Criticism after the Pentateuch) offers and excellent discussion of the major authors and views that have contributed to this field of study, which examines the authorship, sources and development of a book.

Tradition History reviews the theories of oral and/or written compositions that may have contributed to the composition of a book. Other Ancient Near Eastern sources are compared, contrasted and paralleled to biblical passages and cultural practices for insights to the formation and interpretation of the biblical text.

Literary Readings examines the history of approaches that focus on genres, literary features such as repetition of words and phrases, development of literary devices such as plot and characters, as well as interconnection and intertextuality.

Gender and Ideological Criticism, which is a unique contribution, evaluates the portrayal of females and occasionally males, in each book. The criticism provides commentary on the role, characterization and resulting theologies of the portrayal of women. Hess states that his position on gender roles is that of an equalitarian (p. 711).

Ancient Near Eastern Context addresses the historical and cultural milieu of evidence for determining the date, authorship and composition of the book. Archaeological excavations, artifacts and reports are synthesized to help illuminate and/or validate the historical setting of each book. Hess documents many times that some archaeologists claim evidence or conclusions for a biblical context that are based on the absence of evidence in archaeological sites. He incorporates pertinent archaeological discoveries via sidebar sectors that provide significant insights and apologetic comments to the Ancient Near Eastern context. These sidebar sectors are incorporated throughout the book to provide an excellent overview of the contribution of archaeological discoveries. There are over 100 sidebars with commentary, over 50 sidebars with archaeological pictures and images, and a six-page center section of sixteen color pictures of noteworthy sites and artifacts.

The last subsection, Canonical Context, is a blend of Biblical Theology, intertextuality, and citations of the book in the New Testament. This segment provides historical connections throughout the Old Testament and then recognizes the integration of these connections within the New Testament. As with many Old Testament introductions, the theological intertextuality and connections could have been enhanced if the chapters/books were arranged chronologically rather than canonically.

The fourth major component (Theological Perspectives) identifies major biblical and theological themes that are developed throughout the book. These themes provide a foundation for the understanding of the major message or argument of the author(s).

The last major component (Key Commentaries and Studies) offers a list of about six to ten bibliographic references. Hess' annotated comments are succinct and helpful.

The reader will primarily benefit from Hess' integration of various disciplines that provide a foundation for the understanding of canonical formation, historical backgrounds and theological development. The reader should not expect extensive exegetical comments or solutions to theological debates.

This book may be of most value to the student/reader who is preparing for a career in academics such as teaching, research and/or writing (MA, ThM, PhD). The sections on Gender and Ideological Criticism provide the student/reader with unique contributions that are not typical in other Old Testament introductions. The student/reader who is preparing for pastoral, counseling, chaplain or other parachurch careers (MACE, MDiv, DMin) would probably benefit more from other introductions that are comprised of more exegetical and theological commentary. This volume may not provide extensive material that would be of substantive engagement in the church pulpit or classroom.

Hess concludes by writing: “This is not an attempt to provide a comprehensive assessment of every view (or even every major view), but it is an argument that an introduction to the Old Testament must embrace an awareness of the many methods that now flourish.” (pp. 712-13).

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**Volf, Miroslav and Ryan McAnnally-Linz. *Public Faith in Action: How to Think Carefully, Engage Wisely, and Vote with Integrity*. Grand Rapids, MI: Brazos Press, 2016, pp. 256, \$21.99, hardcover.**

Due to the presidential election of 2016, Christian publishers offered numerous resources which focused on pertinent issues related to faith and culture. Among the vast array of books published on public theology in 2016, this book was regarded to be one of the best. In fact, *Publishers Weekly*, the international trade journal of book publishing, selected *Public Faith in Action* as one of the “Best Books of 2016.” After reading this book, I agree that such praise is warranted. Interestingly, this book arose out of Facebook posts the authors used in an effort to help Christians through the issues surrounding the 2012 US presidential election. Regardless of which election year is in view, Christians must contend with the cultural responsibilities and applications of being a disciple of Jesus Christ.

Miroslav Volf (Dr. Theol., University of Tübingen) is the Henry B. Wright Professor of Systematic Theology at Yale Divinity School and founding director of the Yale Center for Faith and Culture in New Haven, Connecticut. He has written more than fifteen books, including *A Public Faith, Exclusion and Embrace* (winner of the Grawemeyer Award in Religion and selected among the one hundred best religious books of the twentieth century by *Christianity Today*), and many other books. Ryan McAnnally-Linz (Ph.D., Yale University) is an associate research scholar at the Yale Center for Faith and Culture. In addition to his scholarly writings, he has coauthored articles with Miroslav Volf for *Sojourners*, *The Christian Century*, and *The Huffington Post*. Readers unaware of Volf’s contributions over the years will find this book to be a helpful introduction to his thought and theological nuance. In fact, I suspect this



work will cause further investigation, and that is just what the authors desire. Volf and McAnally-Linz clearly identify why this book is necessary: “Public life isn’t just for politicians or celebrities. Each and every one of us lives a public life because every life has a public dimension running through it” (p. x). The author’s premise is clear: one’s faith commitments must not be sequestered away from their cultural implications because Christianity is a public faith. In fact, the authors maintain that one’s Christian faith *must* be an *active* faith which includes everything from “our attitudes, our purchases, and our conversations” (p. xi).

The book is structured into three parts. In part 1, the authors provide the basic Christian commitments that inform public life. In this section, readers are helped by introductory comments regarding Christ as the center of the Christian faith, the commitment his followers make to him and the Scriptures, the Spirit’s work in human flourishing, and the importance of reading the Bible contextually. Jesus and the Scriptures are the core commitments of a public faith, and a “commitment to public engagement as Christ’s disciples draws us to the Scriptures as the touchstone for discerning Christ at work. Christ in the world cannot be different from Christ in the Scriptures” (p. 7). Part 2 is entitled, “Convictions,” and this section contains the bulk of the book. The authors maintain that some of the chapters in part 2 “contain fairly definite recommendations about public policy, but their overall purpose is not to lay out a policy platform; rather, it is to sketch out how life together and its institutional implementations might look today if they reflected, however brokenly, the coming kingdom of God” (pp. xi-xii). Readers will no doubt sense a theology of the kingdom of God, with Christ as the center, to be the overall framework for their call to action. In part 3, the authors suggest five character traits that must fuel and guard the Christian’s convictional engagement. These five traits include courage, humility, justice, respect, and compassion. Readers will find part 3 to be refreshing at times, while also sensing the underlying challenge the authors bring to readers. For example, in chapter 21, which is entitled Courage, the authors address the tension between legitimate concerns for a nation’s security and the real need of Syrian refugees. They argue that it “takes courage to stand up for our moral obligation to care for the refugees” (p. 180). They follow this statement up with a helpful, if not underdeveloped, section on the relationship between courage and risk.

There are numerous strengths to this book, and there are a few weaknesses. For brevity, I will describe the strengths and weaknesses together. First, the authors helpfully instruct readers that Christianity informs every aspect of one’s life. One cannot bifurcate Christianity into public and private compartments. Christians must mount a worthy effort to remain engaged in culture and resist the temptation to be satisfied with a lifestyle of a disgruntled cultural commentator. For this reason alone, Christian students (and especially those seeking to pursue ministry) should read this book. The Christian faith is, in fact, an *active* faith, and Volf and McAnally-Linz articulate this belief clearly and winsomely. Secondly, the authors realize that we

need less polarization and more conversation. While the authors do take positions in this volume I find problematic, I appreciate their obvious goal of promoting meaningful conversations around these issues. At the end of each chapter, the authors include a “room for debate” section, which includes helpful questions for readers to consider when formulating a position consistent with the Christian faith. Students and ministry leaders can learn from this practice and implement similar invitations in their discussions with others.

Third, the authors treat marriage and family by maintaining that one must distinguish between the ecclesial question (how should churches respond to same-sex unions), the legal question (should same-sex unions receive the same treatment under the law as traditional marriages), and finally, the moral question (what kind of sex is permissible). Their argument is that Christians should agree on the legal question (we should support the appropriation of benefits to same-sex unions) even if Christians disagree regarding the ecclesial and moral questions. The ecclesial and moral questions should be addressed within one’s church with “minimum possible rending of the body of Christ” (p. 88). While Christians may not prefer the nuance in this argument, it is a helpful approach for dialogue purposes. One criticism of this particular chapter is the lack of conservative voices in their “Resources for Further Reflection” section. Issues such as the environment, poverty, torture, policing, and many others are areas where more Christian reflection is needed. While the authors only provide limited analysis on these subjects, readers will be assisted in their search for dialogue. Throughout the book, readers will detect that the authors argue for more government intervention as part of the solution to so many of these issues, while so many other thoughtful Christian observers argue for less government intervention. Thus, thoughtful engagement must persist among Christians in our public theology.

In summary, students and ministry leaders will find this book to be an overall help even if there are a few areas of concern. The authors should be commended for their approach to these issues.

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