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JOHN WESLEY’S PRECEDENT FOR THEOLOGICAL ENGAGEMENT WITH THE NATURAL SCIENCES

by
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Reflection on the implications of the study of nature for Christian teaching spans the history of the church. This reflection increasingly took on the tone of debate with the transitions marking the “modern” age in Western culture. However, this age also fostered periodic efforts to reframe the interchange between science and religious faith into constructive *dialogue*, seeking to deepen understanding of the differences and heighten appreciation for the areas of resonance. The last two decades have witnessed a vigorous effort at such “science and religion dialogue.”¹

While the current dialogue has yielded many insights, it has been hampered by the tendency to construe “religion” too abstractly. At the most extreme, religion is viewed as a human trait that is assumed to be expressed in all religious traditions. In reality, as the other religious traditions have protested, this supposed generic trait typically reflected convictions of the religions of the Middle East (Judaism, Christianity, and Islam). As such, the most helpful recent studies have begun to pay attention

¹For typological surveys of the dialogue, see John F. Haught, *Science and Religion: From Conflict to Conversation* (Mahwah, NJ: Paulist, 1996); Niels Henrik Gregersen & J. Wentzel van Huyssteen, eds., *Rethinking Theology and Science: Six Models for the Current Dialogue* (Grand Rapids: Eerdmans, 1998); and Ted Peters, “Science and Theology: Toward Consonance,” in *Science and Theology*, edited by T. Peters (Boulder, CO: Westview, 1998), 11–39.

to how the focus of concern about current scientific claims and practices may differ *between* major world religions.

But the problematic impact of abstraction finds expression as well *within* major religions. In particular, the range of variance in evaluating scientific claims and practices can be as wide between alternative theological camps within Christianity as it is between Christians and other religious or secular stances. If we hope to increase mutual understanding and cooperation among Christians in their engagement with the natural sciences, we need to pay more attention to the relevant characteristic and/or distinctive convictions and concerns of the major theological traditions within the Christian church.

My purpose here is to start a conversation about this topic within the Wesleyan tradition. I attempt this by probing John Wesley's engagement with the study of nature in his day, watching for the convictions and concerns that emerge, and suggesting their relevance for our own setting.

Historical Perspective for Engaging Wesley's Precedent

Few would question that John Wesley might provide an instructive precedent for reflections on spiritual formation practices in our postmodern setting. Turning to Wesley for insights about constructive theological engagement with the natural sciences in our day is a much less obvious proposal. To understand why this is the case, and yet why a small—but growing—number of scholars are embracing the latter project, it will be helpful to begin with some historical perspective.

Early Influential Dismissals. The proposal that one might want to consider Wesley when looking for insights about constructive theological engagement with the natural sciences would have astonished Sir Leslie Stephen, author of a two-volume *History of English Thought in the Eighteenth Century* published in 1876. Writing nearly a century after Wesley's death, Stephen assured his readers that "we already find in Wesley the aversion to scientific reasoning which has become characteristic [in Stephen's day] of orthodox theologians."² Andrew Dickson White echoed this evaluation twenty years later in his (in)famous *History of the Warfare of Science with Theology in Christendom*, citing Wesley several times as an influential proponent of beliefs that stifled the emergence of modern

²Leslie Stephen, *History of English Thought in the Eighteenth Century* (London: Smith, Elder, & Co., 1876), 2:412.

science.³ For both writers, the leading indictment against Wesley was his openness to demonic causes of affliction and the possibility of witches, closely intertwined with his corollary providential accounts of events like earthquakes and his expectation of miraculous healing. Also highlighted by White was Wesley's ascription to the Genesis account of creation, where animals are portrayed as naturally domesticated to humans and all death results from human sin, assumptions that conflict directly with the Darwinian model of evolution.⁴

The most significant problem with these influential dismissals of Wesley's precedent for engaging the natural sciences is that they rely mainly on secondary sources and passing comments in Wesley's *Sermons* and *Journal*. As a result, they provide little sense of the scope of Wesley's engagement with the natural sciences—or "natural philosophy" as it was pursued in his day. In 1763 Wesley published for the benefit of his Methodist preachers and people *A Survey of the Wisdom of God in Creation; or, A Compendium of Natural Philosophy*, a two-volume work distilling his reading of several book-length works as well as extracts from the *Philosophical Transactions* of the Royal Society and other journals. By its third edition in 1777 this *Survey* had grown into a five-volume collection. To increase its availability to his followers, Wesley serialized excerpts from the *Survey* in his monthly *Arminian Magazine* beginning in 1781. In addition, Wesley also published *The Desideratum; or, Electricity Made Plain and Useful* (1760) and a number of independent short pieces on topics in natural philosophy in the *Arminian Magazine*. This breadth of material surely qualifies Wesley for consideration as a precedent for theological engagement with science topics, particularly among the various branches of his ecclesial offspring.

Problematic Idealized Appeals. One must be aware of Wesley's broader work to understand the earliest *positive* appeals to his precedent in engaging the natural sciences, which were contemporaneous with White's dismissal—and equally problematic. In 1893 William Harrison Mills gave a lecture titled "John Wesley an Evolutionist" at the Chit-Chat Club in San Francisco. The lecture was circulated as a booklet and a summary

³Andrew Dickson White, *History of the Warfare of Science with Theology in Christendom* (New York: D. Appleton, 1896), esp. 1:128, 148, 340, 361–63, 2:125–26.

⁴Cf. *ibid.*, 1:29–30, 220, 289.

was published in *Popular Science Monthly* the following year.⁵ Sparked by Mills, James W. Lee enlightened readers of the *Southern Magazine* the same year that “the founder of Methodism wrote out the whole theory of evolution and the origin of species. . . eighty-four years before Mr. Darwin published his celebrated work upon the same subject.”⁶ The main difference between Darwin and Wesley, according to Lee, concerned causation—what Darwin attributed to natural selection and survival of the fittest, Wesley attributed to the will of God.

Both Mills and Lee assumed their contention would be surprising, even to Methodists, because so few were familiar with Wesley’s *Survey of the Wisdom of God*. They based their argument on extracts from the *Survey*, particularly from volume 4, which offers a sketch of the “gradual progression of beings” that climaxes:

By what degrees does nature raise herself up to man? How will she rectify this head, that is always inclined towards the earth? How change these paws into flexible arms? What method will she make use of to transform these crooked feet into supple and skillful hands? Or how will she widen and extend this contracted stomach? In what manner will she place the breasts, and give them a roundness suitable to them? The ape is this rough draught of man; this rude sketch and imperfect representation; which, nevertheless, bears a resemblance to him and is the last creature that serves to display the admirable progression of the works of God!⁷

The problem with the appeals of Mills and Lee to this passage is not that it is from Wesley’s abridgement of a book by Charles Bonnet (for Wesley *is* endorsing Bonnet), but that they were blind to the setting of the original quote. Wesley was embracing here the philosophical model of the

⁵William Harrison Mills, *John Wesley an Evolutionist* (San Francisco: Chit-Chat Club, 1893); summarized in “John Wesley an Evolutionist,” *Popular Science Monthly* 46 (1894–95): 284–85.

⁶See James W. Lee, “A Methodist Evolutionist,” *Southern Magazine* (Louisville) 4 (1894): 348–54; here, 348.

⁷See John Wesley, *A Survey of the Wisdom of God in the Creation, or A Compendium of Natural Philosophy*, 4th edn. (London: Paramore, 1784), 4:102. Unless noted otherwise, all references will be to this last edition published under Wesley’s direction. Mills quotes this passage in *John Wesley*, 18; Lee in “Methodist Evolutionist,” 350.

“chain of being” that remained popular in the eighteenth century.⁸ A central claim of this model is that creation demonstrates the perfection of its Creator by its organization into an exhaustively populated series of progressively more complex beings—from the simplest elements to the highest spiritual beings. Importantly, precisely because it was meant to demonstrate an immutable God, this chain of beings was considered static! The progressive description of beings as “higher” or “next” did not indicate their temporal succession. They were assumed to have come into being at the same instant, each as a unique creation of God, and the possibility of change or extinction of any species of being was specifically rejected. They were simply being *described* sequentially. Thus, Wesley was hardly offering a prescient version of Darwin’s theory of evolution.

The claims of Mills and Lee were shaped more by the emerging fundamentalist/modernist tensions of their time than by contextual study of Wesley. This continued to be the case for a series of popular essays in the 1920s that invoked Wesley as a forerunner for accepting evolution in the midst of the controversy peaking in the Scopes trial (1926).⁹ If there was anything new in efforts of this period, it was a tendency to broaden the argument, presenting Wesley as a pioneer of scientific empiricism in general (in the mode of Francis Bacon and John Locke) and of empirical theology in particular.¹⁰ As one champion put it: “Back to Wesley is forward into the spirit of what is best in the twentieth century.”¹¹ In striking contrast to Stephen and White, another insisted:

⁸The standard study of this model is Arthur O. Lovejoy, *The Great Chain of Being: A Study of the History of an Idea* (Cambridge, MA: Harvard University Press, 1961).

⁹Francis M. Larkin, “Evolution,” *California Christian Advocate* 61 (6 April 1922): 4; Karl Stoolz, “John Wesley and Evolution,” *Christian Century* 40 (1923): 663; Frank Wilbur Collier, *Back to Wesley* (New York: Methodist Book Concern, 1924), 34–49; Charles W. Hargitt, “John Wesley—Evolutionist,” *Zion’s Herald* 103 (26 August 1925): 1061, 1088; and Frank Louis Barber, “Wesley, an Evolutionist,” *Canadian Journal of Religious Thought* 4 (1927): 28–33.

¹⁰See in particular Frank Louis Barber, *The Philosophy of John Wesley* (Toronto: Methodist Book & Publishing House, 1923); Charles W. Hargitt, “John Wesley and Science: A Challenge from the Eighteenth Century,” *Methodist Review* 110 (May 1927): 383–93; William C. S. Pellowe, “Wesley’s Use of Science,” *Methodist Review* 112 (May 1927): 394–403; and Frank Wilbur Collier, *John Wesley Among the Scientists* (New York: Abingdon, 1928). Each included the suggestion that Wesley was open to evolution in some form.

¹¹Collier, *Back to Wesley*, 5. Collier was a professor of philosophy, trained in Boston Personalism and teaching at American University in Washington D.C.

While not a few among Wesley's contemporary clergy were noisily engaged in anathematizing such scientists as Newton, Kepler, La Voisier, Boyle and Priestly, . . . this man, busiest of all his cult, found time to acquaint himself with scientific progress and cordially accepted it ... [which is] a splendid lesson and admonition to intolerant and benighted successors of the twentieth century.¹²

Emerging Contextual Studies. The lesson actually dawning on Wesley's successors by the mid-twentieth century was that both the earlier dismissals and the sweeping panegyrics lacked balance and nuance.¹³ They were not sufficiently aware of the specific options in the engagement of theology and natural science, or of the various factors influencing choices between these options—in Wesley's time or in their own. Accordingly, they "read" Wesley anachronistically as exemplifying current positions which they either rejected or championed.¹⁴

An essential resource in guarding against such misreading is careful historical-contextual study of Wesley's writings on science topics. The first serious effort in this regard was published in 1953 by Robert Schofield, professor of the history of science at Harvard University.¹⁵ While clear that Wesley could not be considered a "scientist" by even eighteenth-century standards, Schofield judged that he had broader and more enduring interest in scientific studies than most of his university-educated peers. Wesley's experimentation with and writing on electricity was given particular notice. Most significantly, allowing that there were better specialized treatments of each subject area covered in Wesley's *Survey of the Wisdom of God*, Schofield suggested that there was likely no better single survey treatment for general readers.¹⁶ Schofield suggested

¹²Hargitt, "John Wesley and Science," 393. For a somewhat more reserved encomium, see Pellowe, "Wesley's Use of Science," 403.

¹³An early expression of emerging caution are the chapters on science and evolution in William C. S. Pellowe, *John Wesley: Master in Religion* (Nashville: MECS Publishing House, 1939), 97–121.

¹⁴This point is developed well, with focus on the readings championing Wesley, in Laura Bartels Felleman, "John Wesley's *Survey of the Wisdom of God in Creation: A Methodological Inquiry*," *Perspectives on Science and Christian Faith* 58 (2006): 1–6.

¹⁵Robert E. Schofield, "John Wesley and Science in 18th Century England," *Isis* 44 (1953): 331–40.

¹⁶Cf. *ibid.*, 337–38.

that the biases of Wesley which ran most counter to elements that account for the advance of modern science were his negative attitudes toward mathematics and hypothetical theories.¹⁷

While helpful, Schofield's essay antedated the flourishing of study of the history of science over the last few decades, and particularly of investigations into Christian interactions with science.¹⁸ This makes it all the more regrettable that his essay remained the only serious historical study for forty years. Fortunately, this situation is beginning to change. In the early 1990s John English provided the first rigorous account of Wesley's academic training in the various fields of the study of nature in his day, as well as a nuanced evaluation of Wesley's fluctuating sympathies in the current debates over Isaac Newton's cosmology.¹⁹ Shortly thereafter, John Haas published three general essays that draw on some of the recent scholarship to contextualize Wesley's basic interest in science topics.²⁰

Given Wesley's reliance on multiple sources (often without citation) for his publications, a pressing foundational task is identification of his sources and consideration of how he selectively adopts and adapts them. In the first dissertation ever focused on Wesley's *Survey*, Laura Bartels Felleman has recently demonstrated the insight that can emerge from such study.²¹ This type of textual work is farthest along in the specific area of Wesley's publications on medicine (which includes the *Desideratum* on

¹⁷Ibid., 338.

¹⁸Two recent works that can provide a sense of these developments are Peter J. Bowler & Iwan Rhys Morus, *Making Modern Science: A Historical Survey* (Chicago: University of Chicago Press, 2005); David C. Lindberg & Ronald L. Numbers, eds., *When Science and Christianity Meet* (Chicago: University of Chicago Press, 2003).

¹⁹See John Cammel English, "John Wesley's Scientific Education," *Methodist History* 30.1 (1991): 42–51; and English, "John Wesley and Isaac Newton's 'System of the World,'" *Proceedings of the Wesley Historical Society* 48 (1991): 69–86.

²⁰John W. Haas, Jr., "John Wesley's Views on Science and Christianity: An Examination of the Charge of Antiscience," *Church History* 63 (1994): 378–92; Haas, "Eighteenth Century Evangelical Responses to Science: John Wesley's Enduring Legacy," *Science and Christian Belief* 6 (1994): 83–102; and Haas, "John Wesley's Vision of Science in the Service of Christ," *Perspectives on Science and Christian Faith* 47 (1995): 234–43.

²¹Laura Bartels Felleman, "The Evidence of Things Not Seen: John Wesley's Use of Natural Philosophy" (Drew University Ph.D. thesis, 2004).

electricity).²² The project of providing a critical edition of the full *Survey of the Wisdom of God*, identifying all sources and the changes through various editions, is just getting underway.²³

As adequate critical text is provided it becomes possible to explore more deeply the contextual dynamics and characteristic concerns of Wesley's engagement with his sources. Here again, the most developed studies to-date focus on Wesley's ventures in medicine.²⁴ But enough of a broader sense is emerging to highlight a few items, in hopes of stimulating both additional historical studies of the range of Wesley's engagement with science topics and hermeneutically-sensitive reflections on the insights that might be drawn from his precedent.

Character of the "Science" that Wesley Engaged

We need to begin with some comments on the character of the "science" that Wesley engaged. I have put scare quotes around the word because Wesley inhabited a transitional period prior to the solidifying of many aspects commonly associated with science today. Three points deserve to be highlighted in this regard.

First, Wesley's century was a period of major transition in the self-understanding of the academic study of nature about its goals and methods. This is important to emphasize because an earlier generation of historiography (e.g., Herbert Butterfield, *The Origins of Modern*

²²See particularly James G. Donat, "The Rev. John Wesley's Extractions from Dr. Tissot: A Methodist *Imprimatur*," *History of Science* 39 (2001): 285–98; and Donat, "Empirical Medicine in the 18th Century: The Rev. John Wesley's Search for Remedies that Work," *Methodist History* 44 (2006): 216–26. Donat is editor of the future volume (17) which collects John Wesley's medical writings in *The Works of John Wesley*, edited by Frank Baker and Richard Heitzenrater (Nashville: Abingdon, 1984—). Note: hereafter this collection is referred to simply as *Works*.

²³This project is being supported by the Center for Studies in the Wesleyan Tradition at Duke University, under my direction.

²⁴See Deborah Madden, "A Cheap, Safe and Natural Medicine": *Religion, Medicine and Culture in John Wesley's "Primitive Physic"* (Atlanta: Rodopi, 2007); Randy L. Maddox, "John Wesley on Holistic Health and Healing," *Methodist History* 46 (2007): 4–33; and Randy L. Maddox, "Reclaiming the Eccentric Parent: Methodist Reception of John Wesley's Interest in Medicine," in "Inward and Outward Health": *John Wesley's Holistic Concept of Medical Science, the Environment, and Holy Living*, edited by Deborah Madden (London: Epworth, 2008), 15-50.

*Science*²⁵) presented the “scientific revolution” as taking place rapidly across seventeenth-century Europe. They suggested that “science” was understood in England by the outset of the eighteenth century among leading practitioners like Isaac Newton as a mode of inquiry that was: (1) independent from religious or philosophical constraints, thus equally at home in all cultures and times; (2) aimed at elucidating how the processes of nature work, so that these processes could be used for human betterment; and (3) grounded in a hypothetico-deductive methodology, wedding the certainty of mathematics with the objectivity of rigorous empirical verification of hypotheses. If this model was firmly in place by Wesley’s day, any divergence evident in his writings from these emphases is easily read as resistance to or rejection of science (as by Stephen and White).

But scholars of the history of science over the last two decades have demonstrated that the various emphases just listed for the “modern” understanding of science remained *contested* among leading practitioners through most of the eighteenth century, particularly in England.²⁶ This recent scholarship encourages us to take seriously that folk like Isaac Newton labeled their studies of nature not “science” but “natural philosophy” (e.g., Newton’s *Philosophiae Naturalis Principia Mathematica*, 1697).²⁷ They stress that this latter name reflects important continuities with an earlier understanding of the academic study of nature.

Some background is necessary to appreciate this earlier understanding. Influenced by Aristotle’s distinction between *epistēmē* and *technē*—which passed over into Latin as *scientia* and *ars* (art)—medieval educational practices stressed the difference between pursuing *understanding* of reality (*scientia*) and acquiring *practical knowledge* or know-how (*ars*). One implication was that vocational skills pursued on their own, usually by the lower or servant classes (the *illiberales ars*, or arts of the non-free), were not part of a university education. But the distinction also found expression in university education. The base of this education was training in the seven *liberal arts* (i.e., necessary skills for free men): grammar, rhetoric,

²⁵London: G. Bell, 1949.

²⁶See Andrew Cunningham & Perry Williams, “De-centering the ‘Big Picture’: *The Origins of Modern Science* and the Modern Origins of Science,” *British Journal for the History of Science* 26 (1993): 407–32; and, more generally, Bowler & Morus, *Making Modern Science*.

²⁷Cf. Andrew Cunningham, “How the *Principia* got its Name,” *History of Science* 29 (1991): 377–92.

dialectic, arithmetic, geometry, astronomy, and music. These sets of practical knowledge provided the foundation for students to approach the capstone study of the nature of reality itself (*scientia*)—in philosophy and theology. By the eighteenth century, philosophy had developed sub-divisions of logic, metaphysics, moral philosophy, and natural philosophy. The specific focus of the latter was on *understanding* the natural world (it was often also called “physics,” echoing the Greek word for nature: *physis*).

We can illuminate the assumptions of natural philosophy about its task and methods as it entered the eighteenth century.²⁸ Consider the specific case of studying the heavens. As a *scientia*, natural philosophy traditionally focused on questions like what the heavens are made of; what moves the sun, moon, and planets; and whether the universe is finite or infinite. By contrast, astronomy, as an *art* (integrally connected to mathematics), was concerned with tracking lights in the sky, developing formalized descriptions and predictions of their movements, offering reliable calendars, and other such practical tasks. It had been rare for astronomers to ask what the heavenly bodies were made of or why they moved, while natural philosophers had devoted little attention to mathematics or the practical use of their explanations of reality.²⁹

Challenges to these disciplinary distinctions began to emerge in the late seventeenth century. On one front, Francis Bacon injected the suggestion, which gained increasing hold, that the value of *any* study of nature was proportionate to the technological benefits it provided for human control and exploitation of the natural world. On another front, Newton’s *Principia Mathematica* began to elevate the centrality of mathematics to accounts of the nature of the universe. By the turn to the nineteenth century, these and other threads had woven together the distinct agendas of *scientia* and *ars* in the study of nature. This reality was signaled by the fading of the label “natural philosophy,” with “science” in its modern sense taking its place.

The key point, for our purposes, is that this transition stretched *through* the eighteenth century in England, resulting in numerous works

²⁸This summary draws on several sources; one of the most recent is Peter Dear, *The Intelligibility of Nature: How Science Makes Sense of the World* (Chicago: University of Chicago Press, 2006), 1–14.

²⁹Cf. Peter Dear, “The Mathematical Principles of Natural Philosophy: Toward a Heuristic Narrative for the Scientific Revolution,” *Configurations* 6 (1998): 173–93.

with mixtures of the relevant emphases. Few works in this period embody consistently the assumptions of “modern science” outlined earlier, including Wesley’s *Survey*. The fact that in this “compendium of natural philosophy” Wesley discounted the role of mathematics, for example, is evidence less of his intentional resistance to a recognized commitment of “science” than of his location in this transitional period.

Second, Wesley’s transitional century was marked by prolonged debate among competing models of physics and cosmology, with particular focus on the perceived limitations of Newton’s proposals. This is important to emphasize because a common evidence cited by critics to show that Wesley was anti-science was his hesitance about endorsing Newton. Recent surveys of eighteenth-century science in England make clear that a number of Newton’s professional peers shared this hesitance, and for understandable reasons.³⁰ Everyone recognized that, with its mathematical advances (particularly calculus), Newton’s *Principia* provided a much more accurate *description* of the movement of the planets, comets, and tides. But this was a task traditionally assigned to the *art* of astronomy, not the *explanatory* goal of *natural philosophy*, which Newton claimed in the full title of his work. Thus, Newton’s *Principia* was often greeted at first with stunned incomprehension, even at his own University of Cambridge.³¹

A little background may help in understanding this reaction. Through most of the medieval period the reigning physics was that of Aristotle, which accounted for all natural motion by “final causes” that were integral to every type of being. Thus planets moved in their orbits because they were realizing their *entelechy* (the “desire to fulfill one’s nature”). By the latter medieval period, however, many were dissatisfied with the subtle pan-psychic suggestions of this explanation, spawning alternative *mechanical* accounts of motion in the heavens. The starting premise of these accounts was that entelechy was limited to living beings;

³⁰Good surveys of these debates are available in Peter Hanns Reill, “The Legacy of the ‘Scientific Revolution’: Science and the Enlightenment,” in *The Cambridge History of Science, Vol. IV: The Eighteenth Century*, ed. Roy Porter (New York: Cambridge, 2003), 23–43; John Gascoigne, “Ideas of Nature: Natural Philosophy,” in *ibid.*, 285–304; and William B. Ashworth, “Christianity and the Mechanistic Universe,” in Lindberg & Numbers, *When Science and Christianity Meet*, 61–84.

³¹Gascoigne, “Ideas of Nature,” 289.

physical matter was inert, and was moved solely by the application of external force. But how was this force applied?

Here a divergence emerged within mechanical accounts of cosmic motion, framed by the question of whether space was a void. Accepting that space was a void made it difficult to account for application of force at a distance, such as the influence of the moon on the earth's ocean tides. So most thinkers insisted that space was entirely filled by matter of varying size, including sizes not visible to human observation. René Descartes developed the most sophisticated mechanical account in this vein, ascribing planetary motion to the carrying force of vortices in this cosmic soup. If one instead accepted that space *was* a void, they typically either attributed motion to direct causation by God or echoed earlier hermetic suggestions about “resonance” across distance between certain elements.

Newton stepped into the middle of these ongoing debates. Aligning with the mechanists, he rejected entelevchy, agreeing that matter was inert. Yet he eventually spurned Descartes's hypothesis of forms of matter too small for empirical detection, leaving him with space as a void. While he was willing to speak about God intervening occasionally to adjust the motion of planets and other cosmic bodies, Newton believed that the regularity and interdependence of this motion indicated instead the presence of an abiding natural law. He named this law of mutual influence of bodies upon each another “gravity.” But he immediately conceded that he could not yet explain how gravity conveyed its impact across the void of space. To many of his peers, Newton's “gravity” seemed like another unacceptable appeal to hermetic influences. Others concluded simply that he had failed to do what natural philosophers were supposed to do—provide an account of *how* the movements of bodies take place.

In hindsight, Newton ventured a promising suggestion about how gravity worked in the “General Scholium” he added to the 2nd edition (1713) of *Principia*. At the end of this short piece he referred to an “electric and elastic spirit” that appears to pervade and lay hid in all gross bodies, noting that there was not yet sufficient experimental input to provide an account of its impact.³² It would take a century for further experimentation to result in James Maxwell's account of the dynamics of electromagnetic fields, and the correlation of these with gravitational fields.

³²See *Philosophiae naturalis principia mathematica*, 2nd edn. (Cambridge, 1713), 484; in first English translation, *The Mathematical Principles of Natural Philosophy* (London: Benjamin Motte, 1729), 2:393.

Only at this point was the project of Newton's *Principia* as a "natural philosophy" fully achieved. It is anachronistic to fault those who do not endorse a significant proposed revision of a field of knowledge early in the process, simply because of the eventual success of the proposal. This point has been made effectively against those who criticize the church for not adopting Galileo's cosmology immediately, when a number of his relevant "scientific" peers still harbored significant questions.³³ The same would apply through much of the eighteenth century in regard to Newton's physics and cosmology.

The key point, for our purposes, is not just to suggest that there was some legitimate room for Wesley to be hesitant in endorsing Newton. His awareness of the ongoing disagreement between competing models, and of Newton's precedent for not advancing *explanatory* accounts until there was compelling evidence, also help explain the restriction Wesley adopted in his edited collation of works in natural philosophy:

It will be easily observed that I endeavor throughout not to *account for* things, but only to *describe* them. I undertake barely to set down what appears in nature, not the cause of those appearances. The facts lie within the reach of our senses and understanding, the causes are more remote. That things are so, we know with certainty; but why they are so, we know not. In many cases we cannot know; and the more we enquire, the more we are perplexed and entangled.³⁴

Obviously, this restricted goal falls short of the full agenda of natural philosophy. But Wesley's *Survey* was not intended to *advance* this discipline; it had the more limited goal of providing for his readers a survey of the most interesting and instructive aspects of nature as highlighted in recent work in natural philosophy.

Third, in Wesley's transitional setting, "natural philosophy" retained an overarching theological concern. If we wanted to take the time, we could consider counter-evidence to all three of the major emphases of "modern science" that Butterfield and others suggested were

³³Cf. David C. Lindberg, "Galileo, the Church, and the Cosmos," in Lindberg & Numbers, *When Science and Christianity Meet*, 33–60.

³⁴Wesley, Preface, §5, *Survey*, 1:vi–viii; also in *The Works of John Wesley*, edited by Thomas Jackson (London: Wesleyan Methodist Book Room, 1872), 14:301. Note: hereafter this collection is referred to as *Works* (Jackson).

in place by the outset of the eighteenth century in England. Newton's strong contrast between his adherence to experimental induction and the reliance of Descartes and others upon unwarranted metaphysical hypotheses is just one example that a self-conscious integrated hypothetico-deductive methodology was far from shared. Likewise, Newton's deferral of an account of *how* gravity conveyed its effect fits poorly with the second emphasis listed above. But the suggestion of earlier historiography with which recent scholars have taken the most exception is the sharp separation of "scientific" investigation from religious or theological considerations.

These scholars have argued that, in keeping with its medieval roots, natural philosophy at the outset of the eighteenth century retained an overarching theological goal.³⁵ Its subject-matter was nature, but it approached nature as the "book of God's works." Moreover, it assumed that part of its task was to elucidate the attributes of God that could be demonstrated from God's works. Newton can again serve as our example. The "General Scholium" that he added as the capstone to *Principia* was devoted mainly to insisting that "this most beautiful system of the sun, planets, and comets could only proceed from the counsel and dominion of an intelligent and powerful being," and then elucidating the attributes of this being which we can deduce from "his most wise and excellent contrivances of things." Newton concluded these reflections with an explicit affirmation that such discourse about God, drawn from consideration of nature, "does certainly belong to natural philosophy."³⁶

To be sure, there were occasional figures like Thomas Hobbes who adopted purely materialistic accounts of nature, but these remained rare in

³⁵This point was pressed initially by Andrew Cunningham in "Getting the Game Right: Some Plain Words on the Identity and Invention of Science," *Studies in the History and Philosophy of Science* 19 (1988): 365–89. The sharpest critic of Cunningham has been Edward Grant—cf. "God, Science, and Natural Philosophy in the Late Middle Ages," in *Between Demonstration and Imagination*, eds. L. Nauta & A. Vanderjagt (Leiden: Brill, 1999), 243–67; and "God and Natural Philosophy: The Late Middle Ages and Sir Isaac Newton," *Early Science and Medicine* 5 (2000): 279–98. Most have come to agree in general with Cunningham, as evidenced by Peter Dear, "Religion, Science and Natural Philosophy: Thoughts on Cunningham's Thesis," *Studies in the History and Philosophy of Science* 32 (2001): 377–86; and Peter Harrison, "'Science' and 'Religion': Constructing the Boundaries," *Journal of Religion* 86 (2006): 81–106.

³⁶Newton, *Mathematical Principles of Natural Philosophy* 2:388–92.

England into the last quarter of the eighteenth century.³⁷ Thus, Wesley was echoing the methodological assumption of most of his sources when he described the goal of his compendium of natural philosophy as “not barely to entertain an idle barren curiosity, but to display *the invisible things of God*, his power, wisdom, and goodness.”³⁸ If Wesley went beyond his sources, it was in his characteristic hope that the collection would also “warm our hearts, and fill our mouths with wonder, love, and praise!”³⁹

Characteristics of Wesley’s Theological Engagement with “Science”

The more that careful historical study highlights the differences between the “science” that Wesley engaged and science as dominant today, the more that one might doubt the relevance of Wesley’s precedent for current theological engagement with the natural sciences. But I would suggest that this difference is one of the things that make dialogue with Wesley valuable. If engaged with empathy, the dialogue can increase our awareness of the range of options available for relating theology and the natural sciences. It can also increase sensitivity to the contextuality of *current* reigning scientific models.

One assumption shared by both the dismissals of Wesley’s precedent and the idealized appeals to him as a forerunner at the turn to the twentieth century was confidence in the superiority of their own *modern* view; Wesley was worth considering only to the degree that he agreed with that view. Like David Ford, I appreciate how our “postmodern” situation has encouraged us to challenge modernity’s undue superiority complex, allowing us to recognize in a new way what is of value in premodernity, modernity, and postmodernity.⁴⁰

In this spirit, I want to highlight five characteristics of Wesley’s theological engagement with “science” (or the study of nature), which have been selected in part because of their resonance with strands in the science and religion dialogue of the past two decades. I would stress that I am not hereby trying to rehabilitate Wesley, or show him a prescient precursor of current positions. My goal is more like the hermeneutic quest of

³⁷See Jeremy Gregory, “Christianity and Culture: Religion, the Arts, and the Sciences in England, 1660–1800,” in *Culture and Society in Britain, 1660–1800*, edited by Jeremy Black (Manchester: Manchester University Press, 1997), 102–23.

³⁸Wesley, Preface, §1, *Survey*, 1:iii–iv; in *Works* (Jackson), 14:300.

³⁹*Ibid.*, §7, 1:viii; in *Works* (Jackson), 14:302.

⁴⁰David F. Ford, *The Shape of Living* (Grand Rapids: Baker, 1997), 21.

“merging horizons” between different contexts, in order to facilitate exchange of insights. I would also note that my list is far from exhaustive, being intended more as proposals for continuing research and dialogue.

1. *Committed to a Modest Natural Theology.* It was just noted that natural philosophy retained a theological dimension in Wesley’s day, devoting some attention to implications that could be drawn from study of the material world about the existence and nature of spiritual beings, including the Ultimate Being or God. This attention intersected with another subsection of philosophy in the medieval curriculum known as “natural theology.” The latter was devoted to knowledge about God that could be demonstrated by rational reflection on (1) the human soul; (2) human moral insight, or “natural law”; and (3) the natural world. Thus, natural theology drew the culminating reflections of natural philosophy into a larger conversation about what could *theoretically* be known about God apart from special revelation. I stress the theoretical nature of this knowledge because natural theology was part of the Christian curriculum and its wisest practitioners were aware that they were reflecting on the “book of nature” through lenses shaped to some degree by the “book of scripture.” Their concern was less to elicit faith from non-believers than to confirm and enrich nascent faith.⁴¹

To be sure, not all voices were so wise. There was plenty of fodder to fuel the suspicion of Protestant reformers about the triumph of unregenerate reason over revelation in the enterprise of natural theology. This is not to say that the reformers set the enterprise fully aside. At the very least, they retained some emphasis on universally demonstrable “natural law” as a basis for civil society.⁴² John Calvin went further, affirming that study of nature was a beneficial supplement to study of scripture for those who had the opportunity.⁴³ But the general Protestant emphasis was on

⁴¹Nicholas Wolterstorff develops this point in “The Migration of the Theistic Arguments: From Natural Theology to Evidentialist Apologetics,” in *Rationality, Religious Belief, and Moral Commitment*, edited by R. Audi & W. Wainwright (Ithaca: Cornell University Press, 1986), 38–81.

⁴²For this emphasis in the Lutheran setting, see Sachiko Kusukawa, *The Transformation of Natural Philosophy: The Case of Philip Melancthon* (New York: Cambridge, 1995).

⁴³Cf. Susan Elizabeth Schreiner, *The Theater of His Glory: Nature and the Natural Order in the Thought of John Calvin* (Durham, NC: Labyrinth Press, 1991).

the sufficiency of God's revelation in scripture, rendering theological appeal to the "book of nature" clearly subordinate and surely not essential for basic Christian life.

This is a point where the "Anglican" approach to theological reflection diverged from more staunchly Protestant approaches.⁴⁴ The roots of this difference go back to Richard Hooker, who argued that, while scripture is sufficient for the basic knowledge of salvation, all Christians should be encouraged to seek the fullness of understanding and felicity, which is derived from *conjoined* study of scripture and nature.⁴⁵ This emphasis underlies the significant interest in natural theology that emerged in England in the middle of the seventeenth century and carried through Wesley's life into the nineteenth century.⁴⁶ While strongest in Anglican circles, the interest was evident as well among moderate dissenting writers like Richard Baxter.⁴⁷ Wesley drew upon works in natural theology from both circles for his theological reflections interspersed through *Survey of the Wisdom of God*.

But this brings us to an important question. Why did Wesley designate the *Survey* as a work in natural philosophy instead of natural theology? Part of the answer may have been his recognition that the scope of natural theology was traditionally broader than natural philosophy (including reflections on natural law and the human soul, which play little part in the *Survey*.) But a more important reason was surely his recognition of the difference in amount of attention given to nature itself in the works he consulted of each genre. Works in natural philosophy devoted the majority of their time to describing the natural world, usually gathering their explicit theological reflections in a short section at the end (like

⁴⁴The term "Anglican" is increasingly restricted by scholars to naming a set of emphases firmly in place only by the beginning of the eighteenth century in England; cf. John Walsh & Stephen Taylor, "Introduction: the Church and Anglicanism in the 'long' Eighteenth Century," in *The Church of England, c. 1689–c. 1833*, edited by Walsh, et al. (New York: Cambridge University Press, 1993), 1–64.

⁴⁵Richard G. Olson, "Science and Religion in England, 1590–1740," in *Science and Religion, 1450–1900* (Westport, CT: Greenwood, 2004), 84–91.

⁴⁶In addition to Olson, "Science and Religion in England"; see David M. Knight, "The Rise and Fall of Natural Theology," in *Natural Science Books in English 1600–1900* (New York: Praeger, 1972), 47–62.

⁴⁷See Dewey D. Wallace Jr., "Natural Theology Among the Dissenters: Richard Baxter and His Circle," in *American Society of Church History Papers for 1992 Meeting* (Portland: Theological Research Exchange Network, 1993), 1–38.

Newton’s “General Scholium”). By contrast, efforts in natural theology—like William Derham’s *Physico-Theology* and *Astro-Theology*⁴⁸—were organized around and dominated by theological reflection, interspersing brief appeals to the natural world as springboards for or evidence backing their theological claims. On this spectrum, Wesley’s *Survey* lines up much closer to the “natural philosophy” pole.

The work that Wesley chose to frame and provide the largest portion of text for the first edition of *Survey* was a classic example of natural philosophy, published in Latin by Johann Franz Buddeus while a professor of philosophy at the University of Halle.⁴⁹ The bulk of this textbook is devoted to surveying the natural world—beginning with the human body, then moving to other animals; then to plants, fossils, and the physical elements of earth, fire, and water, finally turning toward the heavens, considering air, meteors, and cosmology. Wesley retained each of these sections in *Survey*, although he omits a subsequent section devoted to debates in physics⁵⁰ (remember his limitation to “describing,” not “accounting for”). His abridgements within the various sections are infrequent, and sometimes amusing—such as the deletion of descriptions of human reproductive organs.⁵¹ More striking are the additions. Wesley incorporated into *Survey* entire new chapters describing birds, fish, and reptiles, as well as numerous examples of natural species and phenomena. Apparently judging that the Buddeus text did not provide *enough* description of the wonders of God’s creation, Wesley scoured a number of books and journals to supplement. If I might suggest an analogy—just as Wesley exhorted his people to immerse themselves in the whole of scripture, not rest content with a few proof texts, he was inviting them to contemplate broadly the “book of nature” (natural philosophy), not render it simply a source for select evidences of divine design (natural theology).

Of course, Wesley *did* believe that the natural world bore evidence of God’s wisdom and design. So there is a theological component in his

⁴⁸William Derham, *Physico-Theology; or, A Demonstration of the Being and Attributes of God from His Works of Creation* (London: William Innys, 1713); and *Astro-Theology; or, A Demonstration of the Being and Attributes of God, from a Survey of the Heavens* (London: William Innys, 1715).

⁴⁹Johann Franz Buddeus, *Elementa Philosophiae Theoretica* (Halle: Glauche-Hallensis, 1706).

⁵⁰*Ibid.*, 253–323.

⁵¹Compare *ibid.*, 70–72, to *Survey*, 1:96.

Survey. But several things should be noted about this component. To begin with, Wesley omits the final section of Buddeus's text, which was devoted to metaphysical description and debates about spirits, angels, and God.⁵² In its place Wesley intersperses through the *Survey* occasional theological interludes that provide more limited reflection on the wisdom and goodness of God as manifest in the aspect of the natural world just described. While a few of these reflections are original to Wesley, he draws most from other writers, including leading exemplars of natural theology like William Derham, Thomas Morgan, Bernard Nieuwentyt, and John Ray.⁵³

Given his dependence on so many works of natural theology, the question recurs of why Wesley did not call the *Survey* a natural theology. One other reason for his hesitation is awareness of a difference in tone. Prominent works of "natural theology" in Wesley's day were sliding from the more modest classical stance of seeking to *confirm belief* into the more ambitious Enlightenment stance of *evidentialist apologetics*.⁵⁴ The latter is a stance which assumes that the path to reliable knowledge requires first setting aside all belief, then accepting as truth only those claims for which there is undeniable or objectively compelling evidence. On this model, the prime task of natural theology becomes demonstrating God's *existence*, not merely reflecting on evidence of God's wisdom and character; and the standard to be attained becomes *certainty*, not merely reasonable consonance. This model could also encourage more strident rhetoric. John Ray's *Wisdom of God Manifested in the Works of Creation* is an example. Peppered through this work are comments that anyone who does not recognize that the world was produced by divine reason must be "stupid as the basest beasts," "stupid as the dirt one walks on," "forsaken of reason," and "sottish."⁵⁵

Wesley clearly recognized this shift in some of his sources, and he was *not* ready to follow. But this fact has not been broadly appreciated,

⁵²See *ibid.*, 326–92.

⁵³In addition to Derham's *Physico-Theology* and *Astro-Theology*, see Thomas Morgan, *Physico-Theology* (London: T. Cox, 1741); Bernard Nieuwentyt, *The Religious Philosopher; or, The Right Use of Contemplating the Works of the Creator* (London: Senex & Taylor, 1718); and John Ray, *The Wisdom of God Manifested in the Works of Creation*, 4th edn., enlarged (London: Samuel Smith, 1704 – the last edition published during his life).

⁵⁴On this distinction, see again Wolterstorff, "Migration of Theistic Arguments."

⁵⁵Cf. Ray, *Wisdom of God*, 39, 47, 122–23, 249, 389.

because there has been little attention paid to Wesley's selective appropriation of his sources.⁵⁶ As one example, while Wesley incorporated into his *Survey* at least four extracts from Ray's *Wisdom of God*, he chose none with the type of strident apologetic agenda just noted.⁵⁷ William Derham's *Astro-Theology* would serve as a more extensive example. The setting for this work is the claim in Psalm 19 that the heavens declare God's glory. Derham declared his purpose as showing:

That the observation of the Psalmist is agreeable to experience, is manifest from the deductions which *all* nations have made from God's works, particularly from those of the heavens; namely, that *there is* a God; and that such as have pretended to atheism and have deduced God's works from chance, etc. are singular and *monstrous* in their opinions.⁵⁸

Wesley incorporates a section of *Astro-Theology* in his *Survey* that comprises nearly a third of Derham's original text, though significantly abridged.⁵⁹ None of the selections chosen have the strong apologetic tone. More importantly, Wesley edits out the few places in the section chosen that echo this tone. For example, Wesley deletes Derham's rhetorical flourish about the stupidity of those who cannot see evidence of God in the regularity of motion in the heavens.⁶⁰

When read alongside works like Ray's *Wisdom of God* and Derham's *Astro-Theology*, the theological reflections that Wesley incorporates into *Survey* can only be described as *modest* in their tone and agenda. While these reflections can speak of nature *displaying* God's wisdom or providential care, they rarely verge on portraying this knowledge as so evident that no rational person could reject it. The general tone is captured well in Wesley's conclusion, which he drew from Matthew Hale's "Account of a Steward." This summary values consideration of the

⁵⁶Felleman, "Evidence of Things Not Seen," 90–92, makes a beginning in this direction.

⁵⁷See *Survey*, 1:308–12, which incorporates Ray, *Wisdom of God*, 134–42, 145–49; and *Survey*, 2:136–40, which incorporates Ray, *Wisdom of God*, 22–31, 61–63.

⁵⁸Derham, *Astro-Theology*, 2–3 (*emphasis* added to highlight Enlightenment tone).

⁵⁹*Survey*, 3:308–12 is an abridgement of *Astro-Theology*, 50–131 (which has very small pages).

⁶⁰Compare *Survey*, 3:311 to *Astro-Theology*, 99–100.

“book of God’s works” not as the *foundation* for belief in God or God’s various attributes, but as a means of *strengthening* the faith, reverence, and love awakened by God’s word, a means of building nascent convictions into demonstrative convictions. This resonates with classical natural theology at its best, much more than with the ambitious evidentialist apologetics of many of Wesley’s peers.

This is an important point to recognize in light of Michael Buckley’s argument that the ambitious apologetic approach paved the way for modern atheism by virtue of the mechanistic theism that it made central to much Christian teaching by the early nineteenth century. A God who is first and foremost the architect and supreme contriver behind nature’s orderly processes is not only subject to being disproved at any moment by alternative accounts for those processes, but also directly blameworthy for any perceived deficiencies in the processes.⁶¹ Moreover, by focusing on the apparent design in nature as the foundation for belief in this God, the evidentialist approach placed a religious burden on the sciences which they could not bear.⁶²

John Hedley Brooke, Professor of Science and Religion at Oxford University, has recently argued that Wesley’s *Survey* remains of theological interest today precisely because its modest claims are less prone to the dangers Buckley highlights in more evidentialist natural theologies.⁶³ I would concur. I suggest that—to the degree that we have imbibed this characteristic commitment—Wesley’s present heirs will find themselves resonating in the renewed debates over natural theology more with modest approaches like that of John Polkinghorne than with the evidentialist agenda of the Intelligent Design camp.⁶⁴

⁶¹See Michael J. Buckley, *At the Origins of Modern Atheism* (New Haven, CT: Yale University Press, 1987), esp. 338.

⁶²Cf. John Hedley Brooke, *Science and Religion: Some Historical Perspectives*. (New York: Cambridge University Press, 1991), 195.

⁶³Cf. John Hedley Brooke, “Science and Dissent: Some Historiographical Issues,” in *Science and Dissent in England, 1688–1945*, edited by Paul Wood (Burlington, VT: Ashgate, 2004), 19–37; here, 21.

⁶⁴See in this regard John Polkinghorne, “Where is Natural Theology Today?” *Science and Christian Belief* 18 (2006): 169–79, esp. 171–72. Concerning the Intelligent Design camp, the issue is not whether their specific “filter” for discerning design is adequate; the deeper concern is their desire for evidence of design that is “fully scientific” and “universally valid,” in explicit contrast with classical natural theology.

2. Calling for Epistemic Humility in BOTH Theology and Science. The modest tone of the theological reflections in *Survey* is not just an evangelistic strategy. It reflects an epistemological conviction that Wesley imbibed with his initial academic training and that deepened and broadened over time. In response to growing awareness of the lack of absolute certainty in most human knowing, seventeenth-century theologians like William Chillingsworth, John Tillotson, and Edward Stillingfleet began to argue that absolute certainty was not necessary. In its place, they advocated a “common sense” approach of asking only for conviction beyond a reasonable doubt. This allowed them to affirm theological claims as reasonable that were not amenable to strict deductive logic.⁶⁵

Wesley was introduced to this stance in his Oxford years and embraced its implications over time. Ultimately, Wesley became convinced that *all* human understandings of our experience, tradition, and scripture itself are “opinions.” They are *interpretations* of their subject matter. While that subject matter may exist as objective fact, our interpretations of it remain *fallible*, and should remain open to the possibility of further confirmation or modification.⁶⁶ Wesley’s mature sense of this human reality is captured in his 1750 sermon “Catholic Spirit.”

In Wesley’s emerging Enlightenment setting, most folk welcomed such recognition of the fallibility of theological claims, with its implication of modesty and openness to further dialogue. Where Wesley ran into opposition was when he suggested that scientific claims were in the same epistemological camp. This assumption on Wesley’s part was clear in the *Survey* from its first edition in 1763, because scattered through this and later editions are accounts of disagreements over both specific issues like the size of the moon and broader issues like cosmological models. In these accounts Wesley typically refused to choose sides, commenting instead on the limits of human knowledge. His reserve triggered a letter from a writer calling himself “Philosophaster,” published in late 1764 in the *London Magazine*, which invoked “clear facts” to dismiss several

⁶⁵See Henry G. Van Leeuwen, *The Problem of Certainty in English Thought: 1630–90* (The Hague: Martinus Nijhoff, 1970).

⁶⁶For more on this, see Randy L. Maddox, “Opinion, Religion, and ‘Catholic Spirit’: John Wesley on Theological Integrity,” *Asbury Theological Journal* 47.1 (1992): 63–87; and Maddox, “The Enriching Role of Experience,” in *Wesley and the Quadrilateral*, edited by W. S. Gunter (Nashville: Abingdon, 1997), 107–27.

alternative positions in these debates and lampooned Wesley's caution.⁶⁷ Wesley's published response worked through the debated topics again, underlining the continuing disagreements among current authors, and concluded by admonishing the writer:

Permit me, sir, to give you one piece of advice. Be not so *positive*, especially with regard to things which are neither easy nor necessary to be determined. I ground this advice on my own experience. When I was young I was *sure* of everything. In a few years, having been mistaken a thousand times, I was not half so sure of most things as before. At present I am hardly sure of any thing, but what God has revealed to man.⁶⁸

Wesley included his letter in subsequent editions of *Survey*, followed by extracts from writers like Robert Boyle who similarly emphasized the disagreements among and limitations of reigning accounts of nature. Wesley prefaced the extracts with the insistence that "I do not *deny*, but only *doubt* the present system of astronomy."⁶⁹

It is important to add that Wesley's hesitance to claim certainty about a particular cosmological model was not provisional. He was not just waiting until conclusive evidence was found. Rather, his epistemic humility was rooted in the theological conviction that "God hath so done his works that we may admire and adore, but we cannot search them out to perfection."⁷⁰ And it was reinforced by his philosophical conviction of the fallibility of our understanding of what God has revealed—whether in the book of scripture or the book of nature.

Wesley's mature epistemic humility was out of step with the push of the Enlightenment for certainty, and particularly with the emerging modern approach to science.⁷¹ But it resonates with a two-sided call for epistemic

⁶⁷Philosophaster, "To Mr. John Wesley," *London Magazine* 34 (Nov. 1764): 570–73.

⁶⁸Letter to the Editor of the *London Magazine* (January 1, 1765), *London Magazine* 35 (1765): 26–29, quote on 28. Philosophaster's reply to Wesley was published in *London Magazine* 35 (1765): 128–30.

⁶⁹Wesley's letter is found in *Survey* 3:321–28, quote on 327. The extracts occupy 3:328–55, with Wesley's opening observation on 328.

⁷⁰Wesley, Preface, §5, *Survey*, 1:vii; in *Works* (Jackson) 14:301. This is the concluding line of his explication of the restricted goal of *Survey* quoted earlier. See also Sermon 69, "The Imperfection of Human Knowledge," I.5–13, *Works* 2:571–77.

⁷¹Cf. Stephen Toulmin, *Cosmopolis: The Hidden Agenda of Modernity* (New York: Free Press, 1990).

humility in the current science and religion dialogue. One side of this call is addressed to theology, with scientists and theologians desiring a “humility theology” that operates on the assumption there is more to know about God and about the natural world than is now known or ever will be known.⁷² The other side of the call challenges the hubris of “scientism,” which seeks to account for all reality—including religion and ethics—on purely naturalist grounds.⁷³ I believe that Wesley’s precedent would encourage his present heirs to support both of these sides, and perhaps press the second side a little further.

Most critiques of scientism focus on admonishing science to “stick to its field,” but say less about the importance of epistemic humility even within its proper field. Wesley was clearly no precursor of the radical skepticism of Paul Feyerabend, but his stress on epistemic finitude strikes some resonance with the emphasis on the contextuality of scientific paradigms introduced into recent philosophy of science by Thomas Kuhn. In my view, the strongest resonance with the balance in Wesley’s comments on “Catholic Spirit” among current philosophies of science is to be found in Imre Lakatos’s model of progressive research programs.⁷⁴

3. Convinced of the Importance of “Honoring the Dialogue.” Given Wesley’s awareness of the fallibility of his “opinions” or interpretations of matters under consideration, he found in dialogue the most helpful way to *test* opinions, seeking those which are most adequate. For theological opinions this involved overlapping dialogues: Wesley modeled testing them in an ongoing dialogue between scripture, tradition, experience of life and the world, and reason, all read in dialogue with other interpreters. When confronted with an apparent conflict between scripture and experience, for example, his way forward proved to be not simply debating which was more authoritative, but engaging in the difficult (and often lengthy) reconsideration of his *interpretations* of *both* of these—and of tradition—often prodded by alternatives defended by others, until an interpretation emerged that *did justice to all*.⁷⁵

⁷²See Robert L. Herrmann, ed., *God, Science & Humility: Ten Scientists Consider Humility Theology* (Philadelphia: Templeton Foundation Press, 2000).

⁷³See Mikael Stenmark, *Scientism: Science, Ethics, and Religion* (Burlington, VT: Ashgate, 2001).

⁷⁴A good introduction to these alternatives can be found in Chalmers, *What is... Science?*

⁷⁵In this description I am trying to provide a more dynamic and dialogical account of what is often termed the “Wesleyan Quadrilateral.”

I want to sketch an instance where Wesley’s dialogue with the “science” of his day—the carefully reflective experience of the natural world—helped him to revise a traditional theological viewpoint, moving to a stance that could do better justice to scripture. While scripture speaks of God’s ultimate salvific goal as the “new heavens and earth” (i.e., transformation of everything in the universe), a variety of influences led Christians through the first millennium to assume increasingly that our final state is “heaven above.” The latter was seen as a realm where human spirits dwelling in ethereal bodies join eternally with all other spiritual beings—a category that did not include animals!—in continuous worship of the Ultimate Spiritual Being.⁷⁶ By contrast, they assumed that the physical universe, which we abandon at death, would eventually be annihilated. Wesley imbibed this understanding of our final state in his upbringing, and through much of his ministry it was presented as obvious and unproblematic.

In the last decade of his life, however, Wesley reclaimed the biblical imagery of God’s cosmic renewal, shifting his focus from “heaven above” to the future new creation.⁷⁷ After a tentative defense of animals having “souls” in 1775, he issued a bold affirmation of final salvation for animals in the 1781 sermon “The General Deliverance.”⁷⁸ While not without precedent, this sermon was unusual for its time and is often cited as a pioneer effort in reaffirming the doctrine of animal salvation in the Western church. Broadening the scope even further, Wesley’s 1785 sermon on “The New Creation” refused to limit God’s redemptive purposes to sentient beings, insisting that the very elements of our current universe will be present in the new creation, though they will be dramatically improved over current conditions.⁷⁹

What contributed to Wesley’s reclaiming of the biblical theme of the cosmic scope of redemption? One factor was clearly a concern about animal suffering and theodicy. Wesley shared the sentiments of his friend George Cheyne:

⁷⁶For a good history of the ascendancy of this model, see Colleen McDannell & Bernhard Lang, *Heaven: A History* (New Haven, CT: Yale University Press, 1988).

⁷⁷For more details on this transition, see Randy L. Maddox, “Nurturing the New Creation: Reflections on a Wesleyan Trajectory,” in *Wesleyan Perspectives on the New Creation*, edited by M. Douglas Meeks (Nashville: Kingswood Books, 2004), 21–52; here, 43–49.

⁷⁸Sermon 60, “The General Deliverance,” *Works* 2:437–50.

⁷⁹Sermon 64, “The New Creation,” *Works* 2:500–10.

It is utterly incredible that any creature . . . should come into this state of being and suffering for no other purpose than we see them attain here.... There must be some infinitely beautiful, wise, and good scene remaining for all sentient and intelligent beings, the discovery of which will ravish and astonish us one day.⁸⁰

Wesley's proposal about this scene would likely have astonished even Cheyne! Wesley had long doubted the adequacy of a theodicy that justified God's goodness in permitting the possibility of the fall by contending that God would restore things to their pre-fallen condition. In his view, a truly loving God would only permit the present evil in the world if an *even better* outcome might be achieved by allowing this possibility than without it. Thus, he insisted that in our resurrected state God would shower humanity with greater capacities and blessings than Adam and Eve ever enjoyed.⁸¹ In "General Deliverance" he extended this proposal to the lower animals, suggesting that, as compensation for the evil they experienced in this life, God would bestow greater abilities on them in the new creation, including perhaps even the ability to relate to God as humans do now!⁸²

While this proposal may strike us as fanciful, and ill-fitting to scripture, I want to stress that Wesley was brought to it through his deeper engagement with leading works in natural philosophy that utilized the model of the "chain of beings" to organize their study. Recall that this model arranges the various "beings" in a hierarchal progression of relative excellence of abilities. For example, fish were higher in the chain than plants, dogs higher than fish, humans higher than dogs, and celestial beings higher than humans. Moreover, a central assumption of the model was that the only type of cosmos fitting for a Perfect Being to produce was one in which every conceivable niche was occupied by its appropriate type of being. The work of natural philosophers became identifying and placing each creature in its appropriate niche.

Lest we dismiss it too quickly, I would note that Clarence Glacken has argued that the modern ecological ideas of the unity of nature and the balance and harmony of nature trace their roots to this model of the chain

⁸⁰George Cheyne, *An Essay on Regimen* (London: Rivington, 1740), 86–87.

⁸¹See Sermon 59, "God's Love to Fallen Man," *Works* 2:423–35; and Sermon 63, "The General Spread of the Gospel," §27, *Works* 2:499.

⁸²See Sermon 60, "General Deliverance," §III.6–7, *Works* 2:448.

of beings.⁸³ Glacken particularly highlights the role of John Ray and Charles Bonnet in adapting the model to frame surveys of the burgeoning knowledge of the natural world in the eighteenth century. Wesley was familiar with Ray's *Wisdom of God* from the early 1730s. He encountered the writings of Charles Bonnet, a prominent Swiss naturalist, in the early 1770s.⁸⁴ It was through Bonnet that Wesley gained deeper appreciation for the implications of the chain of beings. Indeed, he came to value the model so highly that he incorporated an abridgement of Bonnet's two-volume overview of the chain of beings into *Survey* in 1777.⁸⁵

Wesley almost certainly took the suggestion of animals gaining greater powers in the next life from Bonnet, who proposed that the entire chain of beings would be moved up a notch at the end of this age.⁸⁶ A more significant notion that Wesley clearly embraced from Bonnet concerns our human connection with the rest of the chain. He retained in his abridgment of Bonnet a response to the suggestion that it would be better if humans were angels, which counsels:

Confess your error and acknowledge that every being is endued with a perfection suited to the ends of its creation. It would cease to answer that end the very moment it ceased to be what it is. By changing its nature it would change its place and that which it occupied in the universal hierarchy ought still to be the residence of a being resembling it, otherwise harmony would be destroyed. In the assemblage of all the orders of *relative* perfections consists the *absolute* perfection of this whole, concerning which God said "that it was good."⁸⁷

⁸³Clarence J. 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), esp. 379.

⁸⁴Vol. 2 of Charles Bonnet, *La Palingénésie philosophique; or Idées sur l'état passé et sur l'état futur des etres vivans* (2nd edition. Munster: Philip Henry Perrenon, 1770), is among the books of Wesley's library that have survived, in the collection at Wesley's house, London. This volume is signed by Wesley and dated as obtained in 1772.

⁸⁵Charles Bonnet, *The Contemplation of Nature*, 2 vols. (London: Longman & Becket, 1766); cf. *Survey*, 4:60–333.

⁸⁶Bonnet makes this proposal model in *Palingénésie philosophique*, Parts 1–5 (1:187–97) and 14 (2:62–84).

⁸⁷Wesley, *Survey*, 4:62.

If this is taken seriously, there can be no eschatological ideal that limits salvation to humanity (even in the subtle form of stressing that humans are “microcosms” of the whole cosmos). It would be a thwarting of God’s creative will and a deprivation of all concerned!

I am convinced that Wesley’s pondering of this point as he read and abridged Bonnet in the mid-1770s played a significant role in his strong reclaiming of cosmic redemption shortly thereafter. As an Anglican theologian, raised with deep appreciation for the *conjoined* witness of the book of scripture and the book of nature, Wesley was open to welcoming an insight from the science of his day that brought back into focus a biblical (and early Christian) theme that had been obscured. He would surely encourage his twenty-first century progeny to exercise a similar openness in their theological reflection.

4. *Concerned to Push for Appropriate Consonance.* I hasten to add that Wesley would immediately reject any suggestion that the challenge to existing interpretations moves in only one direction—from science to theology. While he did not consider it his role to advance explanatory accounts in natural philosophy, he was more than ready to encourage reconsideration of accounts that appeared to conflict with central theological convictions or broadly-shared understandings of scripture.

An appropriate case in point is Wesley’s response to David Hartley’s *Observations on Man*, published in 1749.⁸⁸ Hartley was a physician and known to Wesley through their mutual friend, John Byrom. Hartley also knew Charles Wesley, and presented him a signed copy of *Observations* shortly after it was published.⁸⁹ Hartley’s study is an early work in physical psychology, which presents all of the operations of the soul—all thoughts, volitions, feelings, etc.—as dependent upon vibrations of fibers in the brain (at least, as long as the soul remains connected to the body). Significantly, Hartley commented in the preface that he had slowly and reluctantly reached the conclusion that this integral association entailed a thorough determinism of all human experience and behavior.⁹⁰

⁸⁸David Hartley, *Observations on Man: His Frame, His Duty, and His Expectations*, 2 vols. (London: Charles Hitch & Stephen Austen, 1749).

⁸⁹The copy is now part of the holdings of the Methodist Archives in the John Rylands University Library (shelf number MAW CW66–67). It bears the inscription “To the Rev. Charles Wesley from the author. June 26, 1753” as well as Charles’s signature.

⁹⁰See Hartley, *Observations*, 1:vi.

Wesley waited to respond publicly to Hartley's study, but eventually made it a main target of *Thoughts upon Necessity* (1774) and an abridged version, "A Thought on Necessity" (1780).⁹¹ In his response it is clear that this instance of dialogue with natural philosophy had not led Wesley to revise his theological emphasis on authentic liberty in human willing. Rather, he stressed his judgment that a thorough determinist account of human behavior undercuts both human moral accountability and the justice of God in condemning or rewarding human actions. These were central theological convictions that he could not easily set aside or credibly interpret in a way compatible with determinism. Yet, Wesley allowed that Hartley's emphasis on the physical dimension of human consciousness and volition contained "a great deal of truth."⁹² Wesley's obvious desire was to affirm the full participation of our physical dimension in inclining humans to various states and actions, while maintaining some modest ability to resist or refuse automatic enactment of these inclinations.⁹³ His ultimate solution in response to Hartley was to insist that God, as sovereign, surely had the power to interrupt the causal chain.⁹⁴

This solution is patently inadequate. It simply substitutes a supernatural account of human behavior for a natural account. Wesley would have been better served by further elaboration of his notion of "liberty" as a category of human nature. But my goal is not to demonstrate that Wesley was able to develop full consonance between theology and the science of his day. It is enough to show that he was concerned to *push for consonance*, in part by encouraging reconsideration of certain models in science.

Wesley's precedent leaves little room for his current progeny to rest content with the supposed peace of a "separate but equal" relationship between theology and science, such as Stephen Gould's proposal of "nonoverlapping magisteria."⁹⁵ It would encourage us instead to engage reigning models in the natural sciences in honest dialogue, reflecting on

⁹¹Wesley, *Thoughts upon Necessity* (London: Hawes, 1774), in *Works* (Jackson) 10:457–74; and "A Thought on Necessity," *Arminian Magazine* 3 (1780): 485–92, in *Works* (Jackson) 10:474–80.

⁹²Wesley, *Thoughts upon Necessity*, IV.2, *Works* (Jackson) 10:469.

⁹³See his discussion of "liberty" in *ibid.*, III.9, *Works* (Jackson) 10:468–69.

⁹⁴See *ibid.*, IV.4, *Works* (Jackson) 10:473. Also in "Thought on Necessity," VI.1, *Works* (Jackson) 10:478.

⁹⁵A brief sense of this proposal, and the alternative stress on consonance, can be found in Peters, "Science and Theology."

where these models resonate with our deep theological convictions and where they create (or, appear to create) significant dissonance. It would also encourage those among us with the appropriate expertise to engage in the important and difficult work of proposing and building support for alternative accounts, *within the relevant sciences themselves*, in those areas of dissonance.

We could name many examples where this kind of work is underway among Wesley's progeny and in the larger church. To stick to the focus of Wesley's concern relating to David Hartley, I will limit myself to suggesting that Wesley would be gratified by efforts like those of Warren Brown and his associates who are seeking to elaborate a neurobiological account of human experience and volition that takes with full seriousness the determinative elements while also elucidating a modest, but real, element of liberty ("agent causation").⁹⁶

5. *Countering the Tendency to Anthropocentric Exploitation.* One of the central dynamics that transformed natural philosophy into modern science over the course of the eighteenth century was the increasing adoption of Francis Bacon's perspective that the value of *any* study of nature was proportionate to the technological benefits it provided for human control and exploitation of the natural world.⁹⁷ Wesley was familiar with champions of this anthropocentric, exploitive emphasis in scientific investigation. He had to look no further than William Derham, who insisted: "We can, if need be, ransack the whole globe. . . penetrate into the bowels of the earth, descend to the bottom of the deep, travel to the farthest regions of this world, to acquire wealth, to increase our knowledge, or even only to please our eye or fancy."⁹⁸

This is another of the passages from Derham that was *not* selected by Wesley for inclusion in his *Survey*. Nor does anything in its vein from other sources appear there. Part of the reason is that Wesley imbibed more

⁹⁶See particularly Warren S. Brown, "Cognitive Neuroscience and a Wesleyan View of the Person," in *Companions and Apprentices*, edited by Maxine Walker (San Diego: Point Loma Press, 1999), 31–39; and Nancey Murphy & Warren Brown, *Did My Neurons Make Me Do It? Philosophical and Neurobiological Perspectives on Moral Responsibility and Free Will* (New York: Oxford University Press, 2007).

⁹⁷For an incisive analysis of this dimension of Bacon, see Carolyn Merchant, *The Death of Nature* (San Francisco: Harper & Row, 1980), 164–90.

⁹⁸Derham, *Physico-Theology*, 112.

deeply than Derham the convictions of the chain of beings model of nature. While this model highlights (as ecologists would today) a range of ways that any particular species might contribute to the well-being of others above or below it in the chain, it also insists that every species has intrinsic value and a right to exist for its own purposes. John Ray, who was deeply shaped by this model, emphasized the relevant implication: “It is a generally received opinion that all this visible world was created for man, that man is the end of creation, as if there were no other end of any creature but some way or other to be serviceable to man. ... Yet wise men nowadays think otherwise.”⁹⁹ Ray offered Wesley a model of *modest anthropocentrism*.¹⁰⁰

Wesley appropriated this model in a way that moved beyond Ray through his distinctive emphasis regarding our role as “stewards.” This emphasis is seen most clearly in his instructions on the use of money, where he criticizes any suggestion that resources put at our disposal are for us to use however we see fit. Wesley insists instead that everything belongs ultimately to God; that it is placed in our care to use as God directs; and that God directs us to use it for the benefit of others once our basic needs are met.¹⁰¹ Extending this principle to the rest of creation, the focus of Wesley’s environmental ethic is better characterized as *theocentric* than anthropocentric. He portrayed the ideal relationship of humanity with creation (modeled by Adam in the Garden of Eden) as one of *modest stewardship*, where we devote our distinctive gifts to upholding God’s intentions for the balance and flourishing of all creation.¹⁰²

Most in Wesley’s day shared his assumption of the idyllic nature of the original creation, with peace abounding between all creatures and humans possessing the knowledge to promote the thriving of the whole. They also shared the recognition that this was very unlike the world in which we live now, with “nature red in tooth and claw” (Tennyson) and humans largely at the mercy of the forces of nature. Differences emerged

⁹⁹Ray, *Wisdom of God*, 127–28.

¹⁰⁰See *ibid.*, 176–77, note 39. Cf. John Hedley Brooke, “‘Wise Men Nowadays Think Otherwise’: John Ray, Natural Theology, and the Meanings of Anthropomorphism,” *Notes Received by the Royal Society of London* 54 (2000): 199–213.

¹⁰¹See Sermon 28, “Sermon on the Mount VIII,” §§11, 25–26, *Works* 1:618–19, 628–29; Sermon 50, “The Use of Money,” *Works* 2:266–80; and Sermon 51, “The Good Steward,” §I.1, *Works* 2:283.

¹⁰²See Sermon 60, “The General Deliverance,” §I.6, *Works* 2:444.

around the implications drawn from the present condition for human interaction with the rest of nature. Many resigned themselves to the situation, as long as we are in the present world.

Among the ones who believed that change was possible, the most significant distinction emerged between those (like Francis Bacon) who championed the mandate to *reclaim the mastery* over creation that was lost in the fall, and those (like Wesley) who pleaded for *resuming the loving stewardship* of creation that we inverted in the fall.¹⁰³ While the first two alternatives could acquiesce to (or even justify) the aggressive domination of other creatures by humans, Wesley is representative of the third alternative in his portrayal of such domination as the epitome of the fallen practices that must be set aside.¹⁰⁴ Deeply aware of how much damage we have done, the stewardship that Wesley called for us to resume is not only modest but *chastened*.¹⁰⁵

This ideal, alongside Wesley naming his compendium of natural philosophy a *Survey of the Wisdom of God in Creation*, suggests a very different rationale for the study of nature (or science) than that of Bacon. We should seek this knowledge, not to increase our ability to exploit nature, but to increase our awareness of the wondrous range of creation and deepen our sensitivity to our integral connection with it all—so that we might more effectively *imitate the God whose mercy is over all his works*.¹⁰⁶ Progeny like that would surely rejoice Wesley's heart!

¹⁰³This distinction is highlighted in Peter Harrison, "Subduing the Earth: Genesis 1, Early Modern Science, and the Exploitation of Nature," *Journal of Religion* 79 (1999): 86–109; esp. 102–3.

¹⁰⁴See esp. his description of the negative impact of humanity upon creation in Sermon 60, "The General Deliverance," II, *Works* 2:442–45.

¹⁰⁵For more on Wesley's precedent for environmental stewardship, see Randy L. Maddox, "Anticipating the New Creation: Wesleyan Foundations for Holistic Mission," *Asbury Journal* 62 (2007): 49–66.

¹⁰⁶Cf. Sermon 60, "General Deliverance," §III.10, *Works* 2:449.