



BETWEEN HEAVEN AND EARTH: Christian Perspectives on Environmental Protection by Fred Van Dyke. Santa Barbara, CA: Praeger, 2010. 247 pages. Hardcover; \$44.95. ISBN: 9780313375361.

Conservation biologist Fred Van Dyke does not want his latest book viewed as yet another general entry into the crowded field of literature on creation care, written by and for Christians. Especially in the first two chapters, he begins by addressing his colleagues in the conservation biology community. He urges them, and others working in conservation and environmental issues, to consider the robust environmental ethic and conservation practice drawn from and part of the Christian tradition, as well as a Christian activism that breaks with the ethical paralysis of current conservation biology and environmental science. Yet, Van Dyke thinks that Christians should also read this book because they will come away with new knowledge, not found in other Christian writings on environmental issues. Principal new insights include an unbroken Christian conservation tradition from the very beginning of the Christian church as well as a compelling and distinctive form of Christian environmental activism.

The prerequisites for addressing these two very different intended audiences do not match up very well. Conservation and environmental scientists are largely unfamiliar with the surveys of biblical exegesis about the nonhuman creation, of environmental theology, of the debates about the roots of environmental problems, and of the church's relationship to environmental matters (chaps. 3-6). Yet these have been recurrent topics in the nearly half century of Christian environmental literature and really do not need further reiteration for a Christian audience of environmental advocates. This fact points to a basic dilemma of the book: is the intended primary audience the actual audience? Sales figures will not help here, but given the clear Christian faith-based content of much of the book, as well as the title, I think the hoped-for more secular conservation and environmental readership will largely stay away. Van Dyke wants to throw this community a lifeline but, given the book's content and voice, it is one they will not likely reach for. A more systematic treatment of environmental ethics and activism per se, which, while based on Christian confessions, theology, assumptions and ultimacies, but one that leaves these largely implicit, would likely be more successful in capturing their serious attention and consideration. The writings of Holmes Rolston III,

environmental philosopher and ethicist who is admired and referenced by Van Dyke, would fall into this category.

If I am right that Christian readers are still the main audience for *Between Heaven and Earth*, what subject matter in this book enlarges their knowledge and charts new directions for Christian perspectives on environment? The middle chapters (3-6), as shown, cover familiar terrain. But the opening chapters (1 and 2) and the closing ones (7-10) break important new ground. As a guide to environmental living, action, and management, environmental ethics (both normative and applied) is today a necessary turn and natural successive next step for Christians writing on environmental issues. Though not an ethicist, as a conservation biologist Van Dyke is well positioned and qualified to take Christian environmentalism in this direction.

In chapter one, he surveys the intellectual tradition in conservation and environmental science and concludes that they are fields without hope, locked into Enlightenment objectivism that excludes ethical judgments and management decisions. He argues for an "ethically overt" (p. 11) conservation science and endorses, from among other candidates for this purpose, the Christian tradition of creation stewardship, based on Christian theology, traditions, and practices. This is a courageous recommendation. Most environmental professionals, if they are open to ethics at all, have been conditioned to entirely exclude this worldview as an ethical solution but, rather, see it as the cause of the world's environmental plight. Chapter two is an informative and eye-opening journey through various contemporary schools of environmental ethics. Each school, Van Dyke argues, runs aground as a full-fledged and fully functional ethic for environmental action because it fails to deal with each and every necessary fundamental question about human relationships to the nonhuman world. Van Dyke wants to demonstrate that a Christian conservation ethic does answer all these questions and therefore is truly comprehensive (chap. 9).

Four chapters follow that, for Christian readers, are a more or less standard account and review of biblical environmental commentary, environmental theology, and ecclesiology, but which for secular environmental professionals constitute the evidence that must demonstrate Van Dyke's assertion. Important for both readerships is his claim of, and evidence for, a continuous tradition of conservation within Christianity. I think this is overstated and without sufficient evidence. The thinkers and

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practices Van Dyke registers and describes are no doubt lone forerunners of present-day Christian conservation efforts, but to weave them into a persisting and integrated cultural tradition of conservation is, I believe, historically untenable. A geographically broader and continuing Christian environmental ethic, one with far greater cultural engagement, is linked to the prevailing, although deeply flawed, nature-grace dualism in medieval and early modern Christian Europe. Clearing forests, draining wetlands and burning grasslands, and then replacing these with the preferred fields, pastures, orchards, villages, and gardens were seen as adding grace (God's gift, humanity's task) to (fallen, disordered) nature, to civilizing, and even finishing it.

Christian environmental education, organizations, leadership, conservation projects, media, and lobbying efforts all come on to the scene post-Earth Day, 1970, the beginning of the modern environmental movement. Chapters seven and eight take important steps to itemize, tell the stories, characterize, and connect together all these different forms of Christian environmental activism. Van Dyke himself was recently appointed Executive Director of the Au Sable Institute of Environmental Studies, a college-level, Christian environmental education enterprise. All such efforts are the beginnings of a truly sustained Christian tradition of environmental conservation. No doubt, there are other stories, undertakings, trailblazers, and associations that have to be added in order to fashion a global history of Christian creation care. Such an account is of great value to Christian environmentalism, establishing a tradition from which others may draw encouragement, common purposes, best practices, expertise, and cultural appropriateness.

With telling examples, the distinctiveness and place of Christian conservation efforts are highlighted throughout these chapters. Slowly, faith-based organizations have become accepted partners among government, NGOs, and international conservation efforts. Christian environmental organizations, Van Dyke underscores, bring necessary distinctive approaches to conservation. Most important is a primary regard for people in their actual relationships to the nonhuman environment, something commonly overlooked by the more technical, policy, and environment-only solutions of mainline organizations. Environmental problems are fallings-out, dysfunctional and alienated relationships among people and the natural world. Environmental conservation restores these relationships into ones of care and fit. It should be pointed out, however, that when it comes to environmental issues, a Christian

ethic is not the only one that treats people and nature together. The biblical warrant for this among Christians is the alienation among humanity, nature, and God and the reconciliation of these three in Jesus Christ. Albeit from a functionalist perspective, environmental anthropologists and cultural ecologists have also long worked with a holistic people-nature paradigm to study and advocate for action on environmental issues.

Environmental activism by Christians has as its goal the recognition and acceptance of an alternate set of environmental values. Nature's intrinsic and instrumental values are both part of a creation that God sees as good. Van Dyke adds aesthetic value in between these two as a third category, a human relationship to nature that can act on behalf of intrinsic worth and does not belong to instrumental value. Aesthetic value bundles the study, enjoyment, contemplation, and appreciation of the beauty of the nonhuman world. Normally, these are regarded as ways in which nature is valuable to people: scientific, recreational, and aesthetic values. Rather than distinguishing a category of value that serves as the motor for a Christian environmental ethic, I much prefer that duties to the natural world be integrated into every type of human interaction with the nonhuman environment.

Between Heaven and Earth makes important contributions to Christian environmental ethics and to the recent history of Christian environmental activism.

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THE HOCKEY STICK AND THE CLIMATE WARS: Dispatches from the Front Lines by Michael E. Mann. New York: Columbia University Press, 2012. 395 pages, notes, index. Hardcover; \$28.95. ISBN: 9780231152549.

Nonspecialists, especially those unfamiliar with peer-reviewed literature and the practice of science, sometimes find reliable information about climate change hard to come by. Michael Mann's *The Hockey Stick and the Climate Wars: Dispatches from the Front Lines* gives a remarkably readable antidote to this problem. If you read only one book on climate change, this one is hard to beat. Since Mann has made important contributions to climate science, and those contributions brought on attempts to assassinate his character, his personal story provides an engaging, easy-to-read context to learn about (1) the science, which he has a gift for describing, and (2) how the often seamier side of the politics

of climate change makes it difficult for laypeople to recognize reliable information on the subject.

Mann became a public figure when he published, with Raymond Bradley and Malcolm Hughes two papers which reconstructed the earth's spatial temperature history for the past millennium. The papers were a step forward in method and in precision, providing yearly resolution of historic temperatures where previous studies had only decadal resolution, but more importantly, quantitative uncertainties. As examples of the reconstruction's resolution, it confirmed anecdotal accounts of a large El Nino event in 1791, and showed that 1816, "the year without summer," was a year that was cold in Eurasia and North America (where our reports come from), but warmer than usual in the Middle East and Labrador (p. 48). The year without summer was largely a local event.

Mann would have remained off the public stage had he and his co-authors not decided to find the annual average Northern Hemisphere temperatures (in Mann's words, "the least scientifically interesting thing one could possibly do"). The result, when plotted, resembles a hockey stick where temperature fluctuates within a relatively narrow range for a thousand years (the handle) followed by a rapid increase (the blade), beginning at the start of the industrial revolution. Even with the large uncertainties in historical temperatures, 1990, 1995, and 1997 were the warmest in a thousand years. The temperatures of those three years have been surpassed consistently since the paper's 1998 publication.¹

Outside the scientific community, Mann's paper became controversial because of its prominence in the Intergovernmental Panel on Climate Change's (IPCC's) Third Assessment Report (2001) and the fact that the temperature history challenged a key contention of climate skeptics.² Many skeptics contend, based on British scientist Hubert Lamb's work between 1960 and 1982 (p. 34), that the earth was warmer during the so-called Medieval Warm Period (MWP) than now (climate scientists now prefer the label Medieval Climate Anomaly).³ Such a view gives succor to those who believe that our current situation is not unusual compared to historic climate fluctuations. In fact, Mann et al.'s reconstruction revealed the MWP. The warmest 100-year period prior to the twentieth century in the reconstruction was 1084–1183, right in the middle of the MWP. But their reconstruction (and subsequent ones) showed that its temperatures were still cooler than the warmest years in the 1990s.

It is important to note that our understanding of the impacts of greenhouse gas increases on climate does not depend on the hockey stick construction. Thus the reconstruction cannot prove or disprove the cause of current warming.⁴ Nevertheless, Mann became a target of skeptics' harassment and character assaults. Peculiarly, the assaults have persisted for fourteen years even as temperatures have continued to rise and at least eleven subsequent independent studies (some using completely different data and different methods) have confirmed the conclusion of Mann et al. concerning modern temperatures being unprecedented.⁵

The harassment included political intimidation from powerful people such as Senator James Inhofe, US Representative Joe Barton (who famously apologized to British Petroleum for the treatment it received in the wake of the Deepwater Horizon oil spill), and most recently, the state of Virginia Attorney General Ken Cuccinelli, who demanded that the University of Virginia turn over essentially every e-mail, record, or document related to Mann during his time at the University of Virginia (p. 237). Inhofe, who claimed from the Senate floor that climate change was "the single greatest hoax ever perpetrated on the American public," threatened investigation in intimidating letters to Mann and others. Barton, as chair of the House Energy and Commerce Committee, demanded extensive materials, including "all financial support you have received related to your research, including, but not limited to all private, state, and federal assistance, grants, contracts (including subgrants or subcontracts), or other financial awards or honoraria," and demanded "the location of all data archives relating to each published study for which you are author or co-author ... such supporting documentation as computer source code, validation information, and other ancillary information," among many other requests in what was clearly an effort to burden and intimidate Mann and others.

Apart from the riveting political and personal story, the book deftly covers a surprisingly broad range of scientific subjects, ranging from basic physics of greenhouse gases, to principal component analysis (PCA), the mathematical method used in the hockey stick papers. Mann demonstrates a nice sense of how much is needed to engage readers with the concepts and results. Dealing with the arcane subject of PCA would seem a quixotic challenge in a book for laypersons, but Mann accomplishes it quite nicely with a very simple example (p. 130ff).

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Those who want to expend a little effort can understand the method and the essence of the flaw in the technical challenge Mann et al. received from climate skeptic Stephen McIntyre (p. 137). Its inclusion is helpful because the skeptic literature often cites McIntyre, with little sense of what he or Mann has done. Later in the book, Mann cites a useful paper from National Center for Atmospheric Research researchers, which reproduced the hockey stick after accepting McIntyre's potentially valid points (eliminating key data sets as McIntyre had done was not valid) and showed that McIntyre's reconstruction failed the statistical tests of Mann et al. for validity (p. 138).

Particularly useful is Mann's description of the "scientific give-and-take" with other scientists resulting from the hockey stick publications (p. 99ff). The give-and-take is a stark contrast to public rhetoric from activists. Mann describes climate scientists' criticisms, what he learned from them, and how they were answered. People often perceive scientific papers as naked events, with no sense of the history and nuances of the papers' development, the foundation on which the papers are built, nor the interplay between the scientists and the subsequent scientific papers they inspire, critical or otherwise. For such, the book offers an intriguing look into science's culture.

Most scientific responses involved details that, if true, would not impact the overall results. For example, one publication that reconstructed historic temperatures from ice cores (scientists analyze isotopic ratios in gas trapped in bubbles to infer historic temperatures), argued that the actual temperature during the "Little Ice Age" (about 1600s to 1800s) was 0.5°C lower than tree-ring-based reconstructions (a significant part of the hockey stick papers' reconstruction). Mann and his co-authors responded that some of the differences could have been due to different seasonality or differing regional emphases between various reconstructions. This dialogue apparently persisted in the scientific literature for some time (p. 100).

Another interesting example is an extended discussion of paleoclimatologist Wallace Broecker's argument that the increase in temperatures Mann et al. observed was associated with the warm phase of an approximately 1,500-year temperature oscillation cycle, that the MWP was also a warm phase from the oscillation, and that the MWP was actually warmer than today, contrary to the hockey stick reconstruction (pp. 101-3). The source of Broecker's

postulated oscillation is changes in the ocean "conveyor belt," the thermo-haline circulation and complex interactions between this circulation and wind-driven circulations, both of which transport energy from tropical to northern latitudes. Broecker argued that limited long-term historical temperature data made millennial oscillations difficult to detect. The interaction is interesting. Mann opines that Broecker's theory has at least "a grain of truth," but that evidence for a prominent role for the conveyor belt in generating millennial cycles is tenuous.

One aspect that makes the scientific discussion useful is that it makes the idea of a scientific conspiracy concerning climate change implausible. There are real arguments, but neither side gives any hope for those who doubt climate change. For example, Broecker, the man who might give comfort to skeptics with his claim that the MWP was warmer than today, stated that human activity was "poking" an "angry beast" with "sticks." Indeed, it seems that the hope of the climate skeptics seems to be to avoid the details that the scientific community discusses because arguments about details indicate the strength of the evidence for the general pattern of human-caused climate change.

In summary, *The Hockey Stick and the Climate Wars* is one of those books you wish everyone would read. Such an outcome would dramatically elevate climate change discussion.

Notes

¹As of 2011, with the exception of 1998, the ten warmest years have occurred since 2001. Mann et al.'s hottest years are no longer in the top ten and will soon be out of the top 20!

²Since then, Mann has also featured prominently in emails hacked from East Anglia University's Climate Research Unit, which he recounts in chapter 14, "Climategate: The Real Story." For a good independent assessment of key issues raised by skeptics concerning the emails, see <http://www.yaleclimatemediaforum.org/2009/12/cru-emails-whats-really-there/>.

³Raymond S. Bradley, *Global Warming and Political Intimidation: How Politicians Cracked Down on Scientists As the Earth Heated Up* (Amherst, MA: University of Massachusetts Press, 2011), 19. (Bradley was one of Mann's co-authors).

⁴With that said, however, if the MWP were warmer than present, it would be observational support for the idea of long-term oscillations in Earth's temperature (see comments involving Wallace Broecker below).

⁵S. Solomon et al., *IPCC 2007a: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2007), section 6.6.1.

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HISTORY OF SCIENCE

GALILEO'S MUSE: Renaissance Mathematics and the Arts by Mark A. Peterson. Cambridge, MA: Harvard University Press, 2011. vi + 336 pages, index. Hardcover; \$28.95. ISBN: 9780674059726.

A standard yarn told by science teachers about the Scientific Revolution is that it was born from the union of experimentation and quantification. This new approach to natural philosophy is typically credited to the heroic efforts and monumental accomplishments of Kepler, Galileo, and Newton, done in the face of reactionary opposition from dogmatic philosophers and narrow-minded theologians. Galileo's transitional role in this narrative is twofold: (1) he is the one who stood up to the church on behalf of science with his advocacy of Copernican astronomy; and (2) he is the one whose scientific approach turned away from Aristotelian forms of causal explanation toward the functional (quantitative) descriptions of modern physics.

This nutshell description contains nuggets of truth, though readers of this journal will likely know ways in which it should be trimmed, qualified, and even rebutted. Historians have long argued over how to contextualize and conceptualize the contributions of seventeenth-century scientists. The present book, modestly priced and carefully edited, makes a fresh and important contribution to our understanding of Galileo, one of the most fascinating and seminal characters of this time period.

Peterson's earlier research focused on connections between mathematics and art in the Renaissance era. With this book, he has moved forward to explore ways in which this sort of material influenced Galileo's scientific work. Historians have, for the most part, investigated possible relationships between Galileo's theories and precedents in medieval natural philosophy, but not in the humanities. Peterson's alternative line of attack is intriguing and breaks new ground. Given that his primary preparation is not in history of science, he is a bit careful in how he formulates his conclusions, but this does not deter him from offering unconventional views on the subject. One nevertheless senses that Peterson strives to "live in" the characters and trends he is writing about. Moreover, his technical training in physics more than qualifies him to evaluate those aspects of Galileo's thought that he focuses upon—Galileo's mechanics and kinematics in his *magnum opus*, *Two*

New Sciences, published in 1638, a few years before his death.

While many think of the clash between science and religion whenever Galileo's name is mentioned, that episode receives scant attention here. In fact, Peterson postpones raising this issue until the *Epilogue*, where he offers his assessment that the conflict's importance in Galileo's life and legacy is overblown and distracts from recognizing Galileo's true significance to science. Galileo certainly had a strong interest in astronomy, but it was not a professional one, and the evidence that he initially thought best-demonstrated the Copernican stance on the earth's movement (the tides) he later came to associate with the action of the moon. Galileo's main and lasting contribution to science *per se* was terrestrial; in his landmark time-squared analysis of falling bodies, he showed how fruitful the combination of experiment and mathematics could be.

Peterson organizes his book into four main parts. In the first part (chapters 1 and 2), after sketching the humanist milieu in which Galileo lived and was educated, he explores the classical Greek and Roman heritage in mathematics available then. The second part consists of four largely independent subparts, each given two chapters: poetry, painting, music, and architecture. Comprising over half of the book, this part examines the various Renaissance arts that had been prominent in the centuries just preceding Galileo. Peterson points out ways in which mathematics entered into these arts and explains how they functioned in Galileo's life and education. After considering aspects of Renaissance mathematics related to the arts, the third part spends one chapter looking at mathematics proper (algebra, geometry, trigonometry) during this time period. The last part finally zeroes in on Galileo's understanding and use of mathematics for his work in science, linking it to the book's previous discussions. As an addendum, Peterson analyzes a thirty-four-page oration given by a student and close follower of Galileo in 1627 upon assuming the mathematics professorship at Pisa. This chapter tantalizingly suggests that the ideas and perhaps even the words themselves are due to Galileo, thus providing us with an additional window on Galileo's view of mathematics, the arts, and their relevance to doing science.

Looking at the sort of mathematics used in *Two New Sciences*, it quickly becomes clear that Galileo is not drawing upon contemporaneous developments in mathematics proper—there is no algebra, no trigonometry, and no incipient calculus. The mathematics

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Galileo draws upon heavily involves ratio and proportion, a topic Galileo had been interested in from his earliest study of Euclidean geometry and also the most prominent part of mathematics used by Renaissance artists in painting (perspective), music (scales and tuning), and architecture (harmonious balance of components). The missing art in this list is poetry, which housed little or no mathematical thinking. Peterson argues, however, that Galileo's flawed mathematical analysis of Dante's inferno in *The Divine Comedy*, presented in two serious but whimsical Florentine lectures connected with his appointment as professor of mathematics at Pisa in 1589, may have become a behind-the-scenes stimulus for his eventually correct work on the strength of materials, the first of Galileo's *Two New Sciences*.

But perhaps even more important to Galileo's way of using mathematics was the Renaissance artisans' attitude toward and outlook on mathematics. While mainstream humanists and educators and even Kepler held a view of mathematics that was rooted in more speculative Platonic philosophy and Aristotelian/Ptolemaic practice, Galileo tacitly adopted a more down-to-earth approach. Mathematical features of the world were not dictated by natural philosophy; they needed to be teased out of and made to fit with the way things actually behave, on earth as well as in the heavens. Galileo (and Peterson, to a large extent) attributes this more humble but commanding role for mathematics to Pythagoras and his true followers, allegedly including Archimedes. One might debate whether grounding this modern perspective on mathematization in these ancients is tenable, but it is clear that the changed view of mathematics emerging in Galileo's work and thinking went against the dominant classical viewpoint of his time and signals a new and wide-ranging utility for mathematics in natural science.

Readers may wish to challenge some aspects of Peterson's presentation for accuracy or interpretation, and one can always quibble about how much influence a changed outlook actually had on the derivation of a new result, but *Galileo's Muse* is a provocative and rewarding book. Its thesis is well argued and offers original insights on a topic that has been mined for decades. Peterson's work deserves a spot on the shelf of every academic library and should be read by anyone interested in the Scientific Revolution more generally, or in the nature of Galileo's place and work therein in particular.

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NATURAL SCIENCE

THE ROCKS DON'T LIE: A Geologist Investigates Noah's Flood by David R. Montgomery. New York: W. W. Norton and Company, 2012. 320 pages. Hardcover; \$26.95. ISBN: 9780393082395.

As a professor of geomorphology at the University of Washington, David Montgomery specializes in the interpretation of landforms. He is interested in the development of topography and the influence of geomorphological processes, such as flooding, upon ecological systems and human societies. Along the way he became intrigued by folklore about large floods from cultures all over the world. Might there be, he wondered, some basis in geological fact behind such tales? *The Rocks Don't Lie* recounts Montgomery's personal encounter with geological and other lines of evidence that might lie behind the most famous flood story of them all—the biblical flood associated with Noah.

Montgomery tells us that Noah's flood and other biblical stories were treated, in Sunday School, as parables "to be read more for their moral message than their literal words." Implicit in his comment is that the historical content of biblical stories was viewed as relatively unimportant. He was satisfied that "Jesus taught how to live a good life and that science revealed how the world worked." An encounter in his thirties with a devotee of young-earth creationism, however, stirred Montgomery to begin exploring why people accepted the idea of a global deluge. In 1998 he read *Noah's Flood: The New Scientific Discoveries about the Event that Changed History*, a book in which Bill Ryan and Walter Pitman of Lamont-Doherty Earth Observatory espoused the idea that rapid infilling of the Black Sea basin at the end of the ice age might have been the trigger behind the biblical flood story. Montgomery began to realize that the flood story of Noah might have a geologically detectable basis.

Such experiences prompted Montgomery to investigate the history of ideas about the nature, extent, and impact of the biblical flood. Why did early Christians generally accept a global flood? What interpretive strategies did later Christians adopt to adjust to geological evidence that counters a global flood? How have scientific knowledge, Christian faith, folklore, and philosophy interacted throughout the past two millennia? In his search for answers to questions such as these, Montgomery

acknowledged his dependence on the work of Martin Rudwick (*Bursting the Limits of Time*), Ronald Numbers (*The Creationists*), Dorothy Vitaliano (*Legends of the Earth*), Norman Cohn (*Noah's Flood*), Arthur McCalla (*The Creationist Debate*), and my own book (*The Biblical Flood*). Nevertheless, his book is no mere rehash of the work of these authors. Montgomery has also read original and additional secondary sources and reworked the material into his own compelling narrative. *The Rocks Don't Lie* is a readable, engaging, informative, and at times humorous historical review that addresses the questions above for a general audience. The author has made things more palatable for the lay reader by including extremely few endnotes. He has incorporated a bibliography.

I would like to single out four features of this book in particular that appealed to me. The first was the personal element. Integrated with the sketches of major individuals and episodes in the history of geology are several narrations of Montgomery's own field experiences that shaped his thinking about the possibility of gigantic floods. The main text begins with a brief account of his experience mapping ancient terraces along the valley of the Tsangpo River in Tibet. From the field evidence, he inferred the former existence of a large lake and was stunned to learn later that the locals already had their own tales of an ancient lake in the area.

Chapter two is introduced by reference to Montgomery's hike from the bottom to the top of the Grand Canyon. En route, he observed the features of the stratigraphy that tell the story of a long, complex history. Once at the top, he visited the National Park Service gift shop where he discovered a creationist book that attributed the geology of the canyon to Noah's flood! "Reading about earth history is one thing; to see and feel it for oneself is another," he mused.

A photograph of part of the spectacular rock exposure at Siccar Point, southeast of Edinburgh along Scotland's North Sea coast, graces the cover of the book. In chapter six, Montgomery recounts his visit to Siccar Point to see for himself the world's most famous outcrop. It was at Siccar Point that James Hutton discovered in 1788 what has become the classic example of an angular unconformity—an ancient erosion surface located between a stack of approximately horizontal sedimentary rock beds that lie above a set of much more steeply dipping sedimentary rock layers. At this outcrop, Hutton recognized incontrovertible evidence for at least two episodes of sedimentation, each of which was

followed by a "revolution" that involved burial and hardening of the sediment layers; tilting, uplift, and erosion of the beds; and subsequent deposition of more sediments on the eroded surface and deep burial, tilting, and so on. "Here," Montgomery wrote, "in front of me, were the rocks that helped inspire geology's core concept of deep time ... Over lunch I read the story in the rocks, laid out plain as day." I can attest that no geologist can visit this magnificent exposure without experiencing a thrill and without feeling the same excitement that Hutton himself must have felt upon first seeing these rocks.

Chapter eleven tells the story of a decades-long attempt by J. Harlen Bretz to persuade fellow geologists that the bizarre landscape of eastern Washington's Channeled Scablands had been formed by catastrophic flooding on a grand scale. Montgomery explains that he had been teaching about landforms at the University of Washington for at least a decade before he ever saw the deep canyons of the Scablands on the other side of the state. One day he was asked by departmental colleagues to help lead a field trip for students to the Scablands. Professing lack of acquaintance with Scabland geology, he asked if he might just tag along to learn about this unique terrain. Much to his surprise he was listed as a field trip leader on the trip announcement. He learned about the Scablands in a hurry!

Other personal experiences included study of the Pasig-Potrero River a couple of years after the great eruption of Mount Pinatubo in the Philippines (chapter seven) and a visit to the Creation Museum in Petersburg, Kentucky (chapter ten).

A second feature that I appreciated was Montgomery's treatment of folklore in relation to geology. The first half of the book features the speculations, hypotheses, and discoveries about the earth by Da Vinci, Descartes, Kircher, Steno, Burnet, Woodward, Halley, Whiston, Scheuchzer, Buffon, Cuvier, Hutton, Kirwan, Playfair, Smith, Buckland, Fleming, Sedgwick, Lyell, Agassiz, and others, most of whom contributed in one way or another to an emerging understanding that the earth is extremely ancient and devoid of compelling evidence for a global flood. The book also reviews the thinking of modern creationism. This material is already familiar to most geologists. But in chapters eight and nine, beginning with George Smith's decipherment of the Gilgamesh flood epic, Montgomery takes us farther into folklore than many of us have gone by highlighting the significant differences in legends from different parts of the world and situated in different geological contexts.

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In the third place, I appreciated the fact that, after reviewing the discoveries of the abundant evidence discrediting a global flood and even the continent-scale floods postulated by Buckland, Sedgwick, and others, Montgomery did not proceed to dismiss the possibility of a historical Noah's flood entirely. In fact, he acknowledged that physical evidence for such a flood might exist. He looked with favor on the Ryan-Pitman hypothesis of a rapid infilling of the Black Sea at the end of the ice age as a geologically reasonable cause of the biblical deluge. Nor did he exclude the possibility of a Mesopotamian flood.

The fourth aspect of the book that I welcomed was Montgomery's balance in treating other people. His tone throughout was conciliatory. Although insistent that geological evidence has discredited the global deluge hypothesis beloved by young-earth creationists, Montgomery avoided the disdain and condescension often directed toward young-earth creationists. He struck me as charitable and respectful toward those with whom he disagreed and recognized that most people are attempting to make sense of the world in the best way that they can.

A further evidence of Montgomery's balance is that he was critical of the geological community for its blindness to the possibility of very large-scale floods. Geologists of the early twentieth century were so beholden to an extreme gradualist approach to geology that they were unable to appreciate the evidence in western Montana, northern Idaho, and eastern Washington for the Lake Missoula-Channeled Scabland floods proposed by Bretz and Joseph Pardee. It was refreshing to be reminded that young-earth creationists are not the only ones who can be so committed to a certain approach to earth history that they are unable to process evidence to the contrary. Geologists and other scientists (indeed, all of us) can do the same. What is encouraging is that the geological profession finally engaged in some serious self-correction and is now comfortable with the inclusion of large catastrophic events in the narrative of geological history. Perhaps one day young-earth creationism will rise above its insistence on a global deluge and make peace with the overwhelming geological evidence for large localized floods as a component of the earth's long, complex terrestrial history.

Montgomery does not tell us his stand on the religious question. He neither labels himself a Christian nor denies that he is one. He expresses openness toward religion and is sympathetic toward those who exercise religious faith. He does not appreciate the hostile attitude displayed by some atheists

toward those who have religious convictions. In his preface Montgomery wrote that "along the way, scientists were as apt to be blinded by faith in conventional wisdom as Christians proved adept at reinterpreting biblical stories to account for scientific findings. The historical relationship between science and religion was far more fluid, far more cross-pollenating than I ever thought—or was taught at Sunday school or in college."

I highly recommend *The Rocks Don't Lie*. The author gives the reader a clear picture of the course of the history of geology and makes it plain why geologists today do not accept the idea of a global flood. At the same time, he is kind to those who are still intrigued by the concept.

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PHILOSOPHY & THEOLOGY

THE SPIRIT IN CREATION AND NEW CREATION: Science and Theology in Western and Orthodox Realms by Michael Welker, ed. Grand Rapids, MI: Eerdmans, 2012. 202 + xvi pages. Paperback; \$32.00. ISBN: 9780802866929.

This collection of short essays (fifteen essays in only two-hundred pages) results from a dialogue held in the fall of 2009 at the *Internationales Wissenschaftsforum* at the University of Heidelberg, a conference supported by the John Templeton Foundation. The contributors are European (East and West) and North American. Theological perspectives represent Orthodox, Catholic, and Protestant perspectives. Scientific areas of expertise include physics, biology, math, and psychology. One also finds two essays by social scientists.

This is a book that betrays its title. The main title might indicate that it contains a discussion of the doctrine of the Holy Spirit in relation to contemporary science. Most of the essays do touch on pneumatology. However, some contain a focus on the human spirit, e.g., Michael Welker in chapter ten, or spirituality in general, e.g., Vladimir Katasonov's chapter, described below. José Casanova's chapter, "Human Religious Evolution and Unfinished Creation," only briefly mentions a general "spirit of creation" on the last page of his essay (p. 202).

The subtitle of this book might lead one to think that all of the essays address the convergence of science and theology. However, only a limited number

of the essays engage this convergence in a significant manner. The first of four sections in the book, subtitled “scientific perspectives,” includes all of the essays that are most direct in bringing science and theology into conversation. To begin Section One, John Polkinghorne explains how physics has moved away from a merely mechanistic view of the world. Though physical systems can be described according to their parts, Polkinghorne offers the concept of “information” as a way of explaining the “dynamical pattern” (p. 7)—and even causal role—of a total physical system. With this, he proposes that the Spirit acts as a hidden top-down cause by inputting active “information” into “the cloudiness of intrinsic unpredictability” (p. 9) in the physical world.

Denis Alexander (chapter two) finds resonances between pneumatology and evolutionary history. His observations on unity and diversity and of order and disorder through both the work of the Spirit and evolutionary history are helpful. However, his attempt to link the emergence of personhood out of impersonal matter in evolution to the progressive revelation of the Spirit is problematic in that it implies that the Spirit emerged from being impersonal in the Old Testament to personal in the New Testament.

In chapter three, Jeffrey Schloss argues that scientific observations regarding the preconditions of life, the nature of life, and the history of evolution are concordant with the biblical portrayal of the Spirit as one who animates, preserves, and brings purpose to life. Although only part of the chapter focuses on evolution, his argument that God has a purpose for evolution (rather than evolution itself being purposeful) and that evolution is directional and progressive well complement the previous chapter.

In the fourth chapter, Vladimir Katasonov outlines a history of the idea of infinity in mathematics (eventually focusing on Russian thinkers) and the close relationship it has had with mysticism and religion (especially the Orthodox name-worshipping spiritual tradition). Nearing the end of the essay, Katasonov proposes that “the name Infinity is a form of God’s icon in mathematics” (p. 62) and that the Divine Name confirms the existence of an actual infinity.

Outside of the first section in the book, there are two essays that take the approach of the social sciences. In the eleventh chapter, Renos K. Papadopoulos emphasizes that those who suffer as a result of significant human conflict or natural disaster do

not all respond with “trauma.” Rather, they respond in a variety of ways (often simultaneously), ranging from psychiatric disorders, to having a new zest for life. Papadopoulos relates an ascetic Orthodox saying to these experiences, which describes how people can remain mindful of their “hell” while keeping hope and remaining open to transformation by the Spirit.

In the final chapter, José Casanova, also a social scientist, highlights how the “application of evolutionary theory to the study of socio-cultural development has been contaminated ideologically again and again” (p. 194) and outlines three phases of human globalization. He concludes by noting challenges from scientific developments including the need to re-sacralize nature in light of the ecological crisis and the challenge of a potential post-Darwinian deism in the light of breakthroughs in biogenetics and other areas where humans could become participants in a new phase of human evolution.

Outside of the above-mentioned essays, few of the essays in this book deal to any great extent with contemporary science. For example, it is not until the last paragraph that Vladimir Shmaliy’s essay, “The Spirit or/and Spirits in Creation?,” makes mention of dialogue with science—and here he only comes to the limited conclusion that “creative dialog is possible between science and religion about the mystery of life and its source—the Holy Spirit” (p. 94). A number of the other essays make brief mention of evolution or neuroscience, but they do not contain the engagement with science that one might have expected.

The lack of engagement with science throughout this book, however, does not indicate that there is nothing of significant value in these essays. If one has an interest in pneumatology, there is much to be gained here. For example, in chapter nine Friederike Nüssel (drawing on Pannenberg) proposes that there is no gap between the Spirit’s work in creation and new creation once the Spirit’s creative activity is understood as enlivening and overcoming corruption. One also finds Frank Macchia (drawing on his *Justified in the Spirit*) arguing in chapter 14 that justification is a pneumatological reality that includes not just divine pardon but the transformation of life which one participates in by faith (he also relates this to “the border of theology and science,” p. 191).

One particular strength of this book is that it contains a number of excellent essays addressing Orthodox theology. For example, while some theologians have been optimistic regarding the Spirit’s

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work in non-Christian religions based on the presence of the Holy Spirit in creation, Vladimir Shmaliy (sixth chapter) notes the Orthodox “guarded attitude to extra-ecclesial spirituality” and their emphasis on the need to discern spirits (p. 91). Another excellent chapter coming from the Orthodox tradition is found in chapter seven, where Sergey Horujy documents how and why the Orthodox tradition (especially the Hesychast tradition) has been more reserved regarding natural theology than their Western church counterparts. All in all, *The Spirit in Creation and New Creation* was well worth reading, and not only for the reasons that the title (and subtitle) suggest.

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WHAT THE HEAVENS DECLARE: Science in the Light of Creation by Lydia Jaeger. Translated by Jonathan Vaughn. Eugene, OR: Cascade Books, 2012. xxiv + 199 pages. Paperback; \$25.00. ISBN: 978-1610970341.

How should Christians understand the “laws of nature?” French philosopher Jaeger examines the natural order from an interdisciplinary perspective, including philosophy of science, philosophy, and theology. She offers some interesting ideas on the subject and challenges some contemporary views on science and creation. However, readers without a philosophy background may find *What the Heavens Declare* a challenging read.

Jaeger uses the term “creationism” in a general sense: “The world is created without specifying the manner of creation” (p. xv). Her aim is to

bring the structure of the Christian worldview to bear on the question of natural order and to construct a notion of laws of nature that fits the Christian faith’s framework for thinking and living. (p. xxiv)

Science, in fact, began as an examination of the world created by God. Jaeger notes that no viewpoints are neutral, and aligns herself with neo-Kantian continental philosophy and the Augustinian tradition with its assumption of “a radical difference between the Creator and the creation” (p. xxi). This asymmetry between the dependent creation and the independent Creator is emphasized throughout the book; chapter 1 especially claims this to be the starting point of scripture and a Christian worldview. Jaeger affirms creation *ex nihilo*, following Augustine (unfortunately without critique or discussion of alternate views), the freedom of creation, the mystery of divine immanence

and transcendence, and redemption as the restoration of creation. She argues against dualism, viewing evil as privation, and against the plenitude principle (the idea of unrealized potential) because it undermines the contingency of creation.

In Chapter 2, Jaeger reinforces the idea of the distinction between God and creation, and argues against any hierarchy of being. She affirms creation as a Trinitarian act, and the *imago Dei* as primarily a relational concept. With respect to science, the idea of laws of nature gradually replaced the philosophical categories of substantial forms. However, this is insufficient as God creates the laws: “all natural things are subject to the same divine law” (p. 39).

Jaeger discusses the order of the created world in chapter 3. Order and structure are evident in biblical creation texts and creation *ex nihilo* confirms “God’s perfect control over all parts of reality” (p. 66). Creation also relates to covenant (e.g., Jer. 33:25–26), which affirms the stability of the natural order along with divine freedom. However, creation as divine decree can be the basis for scientific investigation. Jaeger is clearly against reductionism, noting that different aspects of the world have different structuring principles and that plurality originated with creation. Furthermore, because of the God/world duality, we cannot understand everything; indeed, quests for unified theories are arrogant. Jaeger believes creationism is both more unified and more diversified than the philosophical idea of analogy of being, and provides “justification for the universality of the lawful order as a regulating principle in science” (p. 85). She discusses quantum theory (unfortunately with little interaction with opposing viewpoints), noting that events at the quantum level obey mathematical formulae, and insisting that God is in control of random events (novelty can arise through divine willing, not necessarily through chance).

In chapter 4, Jaeger examines the relational nature of knowledge. Reality is informed by the divine word and humans are reinterpreters of the natural order. However, because of sin and subjectivity, humans can only partially understand reality. Science does not give us privileged access to reality, but only captures certain aspects of it. Knowledge is derivative, situated within space and time, and is “both realistic and relational, objective and personal” (p. 115). There is tension between the knower and the world to be known (curiously, Jaeger does not discuss critical realism). Humans are part of the created order but transcend it to be in relationship

with God. They are free in terms of their submission to the divine order of creation.

In her final chapter, Jaeger attempts to explain the natural order and to clarify how creationism helps us understand the world. She critiques Swinburne's probabilistic natural theology, John Foster's natural theology, pantheism's impersonal nature, scientism's claim to explain everything, and empiricism's refusal to explain anything. The last three avow that the world is the ultimate reality, and reject its transcendent foundation. Creationism claims we are justified in forming theories regarding the genuine created order and, since the lawfulness of the world indicates a Creator, we need religious explanations for the world. We should look beyond observations to that "which confers *consistency, coherence, and meaning* on nature's laws" (p. 157). Creationism views humankind as the ambassador, not the master in the world. Kant and his followers go beyond empiricism and scientism, putting a limit on the claims of reason, endorsing the necessity of science, and affirming the contingent order. However, Jaeger, contra Kant, believes it is possible to know God; incomprehensibility is not the same as unintelligibility.

In concluding, Jaeger reemphasizes the radical difference between Creator and creature. The natural order points beyond itself and is dependent on God for its existence. Creation is multifaceted but not hierarchical; it contains determined structures but is not deterministic or reductionistic. She reaffirms realism—its relational nature, its transcendental foundation, and the possibility of knowing it.

We should put to work the full range of human activities in order to encounter the breathtaking wealth of this world in which we live. (p. 171)

This book contributes to the philosophy of science with respect to creation and offers a nuanced view of the relationship between science and the natural order of creation. I appreciate Jaeger's insistence on the contingency of creation and the responsibility of humans in understanding it. The author repetitively asserts Calvinistic assumptions with respect to divine sovereignty and control, and, although she is to be commended for being upfront regarding her position, I wonder if this is sufficient to explain her frequent neglect of opposing views and alternate biblical exegesis. *What the Heavens Declare* could be improved through an appreciation of the diversity of Christian perspectives on creationism.

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GOD AND THE FOLLY OF FAITH: The Incompatibility of Science and Religion by Victor Stenger. Amherst, NY: Prometheus Books, 2012. 409 pages. Paperback; \$20.00. ISBN: 9781616145996.

Victor Stenger, adjunct professor of philosophy at the University of Colorado, is a self-identified "new atheist." *God and the Folly of Faith* is his latest contribution to this movement. The book claims science and religion have been at war since the stone-age and remain so today. The book denounces Christian faith as a danger to science.

The foreword to the book sets the tone. Dan Barker, a pastor-turned-atheist, recalls a story of a girl who died from untreated diabetes because her parents believed in prayer healing and refused her medical attention. Barker argues the parents were taking the Bible at its word. After quoting purportedly relevant scripture verses, Barker states the "Bible is very explicit that faith will heal the sick" (p. 16) and then asks, "if the Bible is true, then why did Kara die?" (p. 17). His response is that the "obvious answer is the Bible is wrong" (p. 18).

While science collects data and forms, testable theories and models, Barker and Stenger believe "when religion does that at all, it always fails the test" (p. 20). Stenger argues, "The god that most people worship is in principle detectable and should have been detectable by now" (p. 21). But Stenger is unable to discern any activity of God, whether in the universe, in scripture, or in Jesus. Stenger concludes that for God to remain unseen requires God to have deliberately hidden himself, implying an unkind and unjust God. The circular reasoning here is very apparent.

Stenger claims the world is worse off as a result of (Christian) faith. He calls for new atheists to "act for the sake of the betterment of humankind and the future of our planet" (p. 21). Stenger rejoices that young people are increasingly abandoning religion. He has hope that in "another generation, America will have joined Europe and the rest of the developed world in casting off the rusty chains of ancient superstitions that stand as an impediment to science and progress" (p. 23).

If science did not work, Stenger argues, we would not do it. In contrast, he claims, "relying on faith, religion has brought us inquisitions, holy wars, and intolerance." He believes "religion does not work, but we still do it" because it has the properties of a virus (p. 25). Stenger fails to realize, by his own reasoning, that religion may exist because it works in ways he fails to understand.

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Stenger holds that “science is the systematic study of observations made of the natural world,” while “in contrast all major religions teach that humans possess an additional ‘inner sense’ that allows access to the supernatural” (p. 26). As a materialist, Stenger believes such teachings are false. He claims that there is no evidence of prophetic fulfillment and no evidence that feelings of contact with the supernatural correspond to anything beyond normal physiology.

Throughout the book, Stenger criticizes “God-of-the-gaps” reasoning. Stenger believes science will eventually fill the holes, rendering faith needless. But if the supernatural exists, he claims we should be able to observe its effects in the physical world by scientific means.

Stenger acknowledges problems that science has brought about in the world, but places the blame on “disgraceful examples of scientists working for oil, tobacco, and pharmaceuticals” and ignorant churches who believe their lies. Stenger says “we can solve the problems [of] misuse of science only by better use of science and more rational behavior” (p. 27). Stenger fails to recognize here that specifying a “better” use of science requires judgments beyond science.

According to Stenger, while liberal theologians accept discoveries of science, the theologies of all ages still promote a worldview antithetical to science. Stenger claims that by believing that God is somehow involved in evolution, even moderate Christians “do not fully accept Darwinian evolution” (p. 29). He says not a single Christian fully accepts evolution, because Darwinian evolution implies all life is accidental and unplanned. Theistic evolution is, for Stenger, another version of Intelligent Design. Stenger contradicts himself by calling Kenneth Miller “one of the most effective spokespersons in support of Darwinian evolution” with an intricate knowledge of the science, while also recognizing Miller as a devote Catholic. Stenger tries to escape a contradiction by defining Miller as a deist rather than as a theist and stating that it is really theists he is complaining about and not deists.

For Stenger, observation is the sole valid source of all knowledge, including science. In contrast, he sees the source of knowledge in theology as primarily faith, plus only some reason and observations allowed. For Stenger, “fundamentalist Christian beliefs” of virgin birth, miracles, revelation, prophecies, and resurrection are in conflict with his defini-

tion of science and, thus, must be wrong. Stenger demands that

those who rely on observation and reason to provide an understanding of the world must stop viewing as harmless those who rely instead on superstition and the mythologies in ancient text ... For the sake of the future of humanity, we must fight to expunge the fantasies of faith from human thinking. (p. 30)

He warns of dangers from the triad of religion, anti-science, and extreme conservatism and its ties to “greedy corporate executives and politicians who exploit anti-science.”

Stenger admits that anti-science exists on the liberal end also, but claims it is more benign because the “extreme Left possess little power in America today, while conservatives wield huge resources that give them influence far exceeding their actual numbers” (p. 30). One wonders here about Stenger’s grasp of the actual state of political affairs in the US.

Stenger’s book is his “call for scientists and other rationalists to join together to put a stop to those who insist they have some sacred right to decide what kind of society the rest of us must live in.” He writes that his group must do this “for the sake of the future of the planet and the betterment of humankind” (p. 30).

In chapters 1–3, Stenger narrates a history of conflict between science and religion from the time of cave people through the age of Enlightenment. In chapters 4–11, he argues that the materialist, reductionist paradigm offers better answers to the set of issues often raised by theists: the nature of reality; origin of the universe; fine-tuning; the argument by design; evolution; quantum consciousness and a holistic universe; reductionism and emergence; information theology; the nature of mind, free will, and consciousness; the origin of morality; and modern theology.

Stenger intersperses his opinions with denigrating comments about scripture, theologians, and Jesus. He believes that “the Bible is so filled with violence, contradictions, and downright errors that it provides no reliable source for the nature of reality or morality” (p. 78). He holds that “the New Testament is hardly the handbook for righteous behavior that Christians think it is. Jesus was not exactly a paragon of morality” (p. 254). “The faithful in the pews are kept in the dark about theology by their pastors” (p. 224). For Stenger, religion and especially Christianity “is a virus ... of the mind that acts in the way a biological virus acts in living organisms” (p. 124).

Stenger believes religion is like a parasite humans would be better off without (p. 290).

Stenger returns to his “call-to-arms” for new atheists. He fears that Christians dominate the US government at all levels, and therefore that religion is “too destructive a force in society to just sit back and allow it to spread unopposed” (p. 299). Stenger warns the new atheists that the stakes are high. He fears that the Christian Right is trying to replace democracy with theocracy. He acknowledges that most scientists would scoff at that notion, but says they need to look at the data. He claims that many books have been written of these “dangers,” including a “secretive Christian group known as ‘The Family’” (Focus on the Family?) that arranges Washington prayer breakfasts. Stenger believes that “scientists have to stop sitting back and start stepping up to challenge religion.” For him, “their welfare, and indeed the survival of our species, is at stake” (p. 301). As examples, Stenger believes that an anti-science Christian movement was the main opposition to studies of the dangers of secondhand smoke and the greenhouse effect.

Stenger concludes the book with his exhortation that the new atheists “need to focus attention on one goal ... which has to be achieved someday if humanity is to survive: the eradication of foolish faith from the face of this planet” (p. 322).

The book is a disappointment as an examination of aspects of the science/religion debate. Stenger’s understandings of scripture and the manner God can interact with creation is naïve. Going beyond the overarching bias in the book and its circular reasoning, there is little new material that has not been more deeply developed in other books. The discussions in the initial and final chapters are especially vitriolic, while often concurrently trivial. It is at best worth reading to better understand the mindset of the “new atheists” and why they are so bothered by religion, Christian faith in particular.

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TIME IN ETERNITY: Pannenberg, Physics, and Eschatology in Creative Mutual Interaction by Robert J. Russell. Notre Dame, IN: University of Notre Dame Press, 2012. 440 pages, index. Paperback; \$49.00. ISBN: 9780268040598.

It is commonplace in current religion-and-science conferences and literature for religion scholars to take science seriously. What would happen if scien-

tists took theological ideas as a starting point for work within their own discipline and were guided in their research by what they learned? That scientists have been influenced in their approach to natural knowledge by their theism is well documented historically. But what about today? One of the world’s foremost scientist-theologians, Robert J. Russell, exemplifies this possibility in a long-awaited, major monograph here under review. Russell is well known as the founder and director of the Center for Theology and the Natural Sciences and is the Ian G. Barbour Professor of Theology and Science. The book under review is an outstanding example of what Russell (and to be honest the present writer) have been promoting for some decades: mutuality between theology and science as academic disciplines.

Let me say at once that this is an impressive, technical monograph. Russell demonstrates a range of deep learning not only in the mathematics of relativity theory, but also in the philosophy of time, theology, physics, and the mathematics of infinity, including set theory. This is not a book for beginners, or even for the seasoned student. Just understanding the major argument of the book may take several readings, along with significant background knowledge on the part of the reader. That said, this is a fascinating study that will reward the serious student who engages the ideas, argument, and proposals Russell puts forward.

At the core of this proposal is an acceptance, central to the Christian faith, of the bodily resurrection of Jesus from the dead as a *real spacetime event*. It is not just a matter of preaching, or message, or story, but something real and bodily. Russell takes up Wolfhart Pannenberg’s defense of the bodily resurrection, along with Pannenberg’s notion that this act of God is an act “from the future,” that is, a “proleptic” eschatological act (a term Pannenberg borrows from literary criticism). Indeed, the book under review both expounds in a clear, convincing and learned way the theology of Pannenberg, and draws upon his theology to develop a physical-mathematical interpretation of time and space, eternity, and omnipresence in the light of contemporary physics.

After an introduction summarizing the book, Russell sets out a number of appendices that provide background perspectives for the book’s overall argument. This includes both a setting out of his general program for creative mutual interaction (CMI) in theology and science and a defense of the resurrection of Jesus following the lines of Pannenberg’s

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thought, as well as other topics. What is important about his scheme of CMI is that he includes not only rational influences from science to theology, but also from theology to science. The purpose of this work as a whole is to provide an extended example of this mutual interaction between physics and theology. Russell has chosen the theme of time as his topic and finds Pannenberg's work on time and eternity the most persuasive contemporary theological work on the subject from a Christian systematic theologian (p. 28). Part One of the book (chaps. 1-4) reinterprets and translates Pannenberg's theology of time and eternity in terminology more at home in mathematical physics. Russell does a fine job of both expounding Pannenberg's views and of making sense of them scientifically. In fact, I think that the author actually improves upon Pannenberg at several key points.

As Russell rightly notes, Pannenberg's views on God's infinite being, including divine eternity and omnipresence, are based upon Hegel's notion of the infinite. That notion, in which a true infinite being must include the finite within itself and transcend both somehow, is logically flawed and metaphysically dubious. It is to be regretted that Pannenberg followed this theory in his theology (see further W. L. Craig, "Pantheists in Spite of Themselves: God and Infinity in Contemporary Theology," in *For Faith and Clarity*, ed. J. K. Beilby [Grand Rapids, MI: Baker Academic, 2006], 135-56). Now Russell replaces Hegel's view of the infinite with Cantor's Absolute Infinite, developed in his set-theoretical conception of infinite and transfinite in mathematics. This "translating" of Pannenberg's theology into more scientific language is, in fact, an improvement, not just a translation. While the idea of infinite being is not the only example of such clarification-as-translation, it is perhaps the most obvious and central one.

Having translated Pannenberg's eschatology and doctrine of God into scientific terms, and along the way explained many of the characteristics of contemporary spacetime physics based upon the special theory of relativity (STR), Russell then sets about seeing the ways in which such theological concepts could influence further scientific discovery, as well as the interpretation of accepted theories in physics. Pannenberg argues that God acts "from the future," and also that eternity is in some ways present to Christians now. What is more, in his view, God's eternity contains and somehow heals or overcomes the loss of reality in the past-present-future movement of time (temporal process or "flow") as we know it. Russell translates these ideas in spacetime physics, arguing for a relational view of process-facts like present, past and future, which then allows

him to argue that given STR, process facts are *relational* terms relative to light-cones. An event present for one observer can be future for another, etc. Events in the future are not simply future, on this view, but future-for-Q (which allows some to be "present-for-R" in another frame of reference).

Perhaps we are ready now to state the thesis of this book, or at least part of it, in this quotation from p. 279:

In essence, I described a way to correlate the divine attributes of eternity and omnipresence by identifying particular events in time for a given observer with particular events in space for that observer in a relativistically invariant way. These spacelike events then constitute the global present for that observer, and in turn the events to which God is omnipresent.

God's infinite Being includes the whole of spacetime within Godself. On this basis it makes coherent sense to say that God acts in the present (or in the past, as at the resurrection of Jesus) *from the eschatological future*. This is because, for this theology, all times are eternally co-present to God's infinite Being.

Now Pannenberg famously wants to have his cake and eat it too, by holding that God's eternity includes all of temporal reality—past, present, and future—and still holding to a dynamic view of temporal process within creation (what is often called an "A" theory of time) in which past episodes of history are not fully real (they used to be, but are not now), and future episodes are not fully open, not having reality yet. Here Pannenberg is similar to Barth, who likewise insists on both. Such a view may be attractive; whether it is coherent has generally been the problem.

Russell has a creative proposal for overcoming this problem, by developing what he calls a "flowing time" interpretation of spacetime. He explicitly rejects the stasis or "B-theory" of time, in which process facts are not objectively about the cosmos, but are mind-dependent. On stasis theories, real, objective time consists in a structure of before and after, rather than in process facts such as presentness or futurity. So Russell allows that the present as defined within a specific inertial frame of reference ("light cone") actually defines reality, *but only for those in that frame at that time*. This leads to a causal invariance that is not global across spacetime itself. Russell boldly accepts this ontological fracturing of spacetime, calling it "inhomogeneous temporal ontology" (p. 303). He then holds that because the causal future (for an observer in a given light-cone)

is open, and the causal past is closed (again, relative to that frame) this is just a “flowing time” theory.

While this is a detailed and learned work, Russell makes it clear that his proposals are open to further discussion and development. So I will close this review with just two of the many questions which raised themselves to my mind after studying this book. First, does the view he calls “flowing time” simply collapse temporality into a causal structure? As a philosopher of time, I find that process-facts make causal asymmetry ontologically *possible* in the actual world, but do not *reduce down* to causal asymmetry. So I wonder if what Russell calls “flowing time” is actually a theory of dynamic temporal process. In other words, Russell may be developing a type of stasis or B-theory of time after all. Second, is Russell’s inhomogeneous temporal ontology consistent with the *general* theory of relativity and the uniform expansion of the cosmos since the Big Bang?

This is a solid work of scholarship that provides a creative and important contribution. The amount of learning, understanding, and depth of research in both theology and physics is impressive. Future scholars interested in God, time, and eternity, or looking for a solid example of theology and science in mutual interaction, will want to study it carefully.

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A UNIVERSE FROM NOTHING: Why There Is Something Rather than Nothing by Lawrence M. Krauss. New York: Free Press, 2012. xix + 204 pages, preface, illustrations, index, author information. Hardcover; \$24.99. ISBN: 9781451624458.

If the title and subtitle of Krauss’s book do not tell you that he intends to challenge basic religious beliefs, the announcement on the cover of an afterword by Richard Dawkins should. A major thrust of this presentation of modern cosmology is indeed an attempt to debunk ideas that the existence of the universe requires God. Religious believers should not, however, conclude that it is simply a bad book. Krauss’s argument has major flaws, but there are aspects of it that theologically serious people should take to heart. Beyond that, this work by one who has done extensive research in particle physics and cosmology and has written several popularizations of science will help to bring readers to the current frontiers of cosmological research.

We can begin with theologically unproblematic matters. The observations that established the basic big bang model of cosmology—the relation between galactic distances and redshifts, the microwave background radiation, and the abundances of the light elements—are, of course, sketched here, together with the theoretical framework of Einstein’s general relativity. But Krauss does not dwell on these now-classic aspects of the field. Instead, he focuses on recent observational discoveries and theoretical speculations that go beyond them. Detailed observations of the microwave background enable us to see slight thermal fluctuations that would grow into clusters of galaxies, and the sizes of these regions lead to the inference that space (not space-time) is flat. The motions of galaxies and clusters of galaxies force us to accept an idea long suspected by some astronomers, that the amount of dark matter, detectible only by its gravitational effects, is several times larger than the amount of matter that we can see. And observations of distant supernovae have finally established the cosmic distance scale with precision and determined the time elapsed since expansion began 13.72 billion years.

None of those results were a tremendous surprise. What did startle many cosmologists was the further discovery that cosmic expansion is speeding up, a consequence of the negative gravitational effect of dark energy. The cosmological term that Einstein introduced into his field equations in 1917, and later rejected, seems to account for this. Krauss is justifiably proud of the fact that he and a colleague argued for what he calls the “crazy” idea that space is flat and that expansion is speeding up a few years before there was observational confirmation. A nonzero cosmological term was, however, not quite as “heretical” a claim as he suggests. There had always been relativity theorists who thought that this term should not just be equated to zero, but had to be determined by observations. Eddington, in particular, insisted that it would not be zero. In any case, there is a big problem here. As Krauss points out in his discussion of the quantum vacuum in chapter 4, the energy associated with the vacuum ought to be a monstrous 120 orders of magnitude larger than the dark energy that we infer from observations! Clearly, we are missing something important, and there is plenty of room for further work.

One implication of accelerating expansion is presented in chapter 7, “Our Miserable Future.” The repulsion due to dark energy does not break up gravitationally bound systems like our local cluster of galaxies, but as time goes on, all other clusters will be swept away from us at increasing speeds, eventu-

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ally passing beyond our “horizon.” In two trillion years, our local cluster will be alone in empty space and the kinds of evidence that have pushed us to develop big bang cosmology will not be available to astronomers of that distant epoch. They might never be able to learn that they lived in an expanding universe.

Now we need to look at the questionable aspects of the book. When you open it, the first thing you read is a quotation by Neil deGrasse Tyson that begins, “Nothing is not nothing. Nothing is something.” The “nothing,” from which Krauss describes the contents of the universe arising, is the quantum vacuum in space-time, fluctuating quantum fields of which particles like electrons and photons are modes. Evanescent virtual particles continually pop into and out of existence. Under certain conditions, most interestingly in connection with gravitation, these transient entities can become real particles. The negative energy of their gravitational energy can cancel their rest and kinetic energies, so that real particles can emerge in a state of zero energy.

So far, so good, but now comes the problem. Krauss seems to think that the classical doctrine of “creation out of nothing” (*creatio ex nihilo*) meant simply creation out of empty space, so that he has explained this scientifically. But the *nihil* is no-thing, an absence of anything at all—space, time, fields, particles, strings, etc. Krauss accuses philosophers and theologians of changing their definition of “nothing,” but he is the one who is playing a word game, saying that nothing is something but that is really nothing.

He does, however, move beyond the relatively simple model of fields in a pre-existing space-time. In general relativity or quantum extensions of it, space-time is not simply a passive arena for the interaction of particles and fields but is itself dynamic, affecting and being affected by those entities. In the context of theories of inflation and multiverses, Krauss points out that it may be possible to explain how space-time comes into being. But this still leaves the origin of gravitation (that is, the dynamic character of space-time) and the fields associated with particles unexplained. And when in chapter 11 he argues that the laws of physics require no explanation because in the hypothetical multiverse there are universes obeying perhaps any conceivable set of laws, we have to wonder if anything at all is being explained.

So while the book presents a good picture of the current state of theoretical and observational

cosmology, the philosophical and theological arguments are badly flawed. The afterword by Dawkins adds nothing to this except premature gloating.

I hope, though, that Christians will be encouraged by Krauss’s arguments to think about the real implications of modern cosmology for their beliefs. The God who demands acknowledgment of his existence by being “necessary” for various features of the universe is not the one of whom it is said, “Truly, you are a God who hides himself” (Isa. 45:15, NRSV). While science has not explained *creatio ex nihilo*, it seems that the Creator has arranged things so that scientific investigation could come as close as is logically possible to that goal. The God of the philosophers would not have done that, but the God revealed in the event of the cross apparently has.

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RELIGION & BIBLICAL STUDIES

THE EVOLUTION OF ADAM: What the Bible Does and Doesn’t Say about Human Origins by Peter Enns. Grand Rapids, MI: Brazos Press, 2012. xx + 172 pages. Paperback; \$17.99. ISBN: 9781587433153.

Peter Enns wrote this book to persuade Christians that “the biblical authors tell a very different story of human origins than does science” (p. ix). He argues that a modern critical approach to the origin of the biblical books supports the scientific conclusion that justifies a Christian’s abandonment of any notion of the biblical Adam as an actual person.

Enns’s book comes with strong commendations from people familiar to the ASA: Ted Davis, Denis Lamoureux, and Karl Giberson. Unsurprisingly, I find this book’s case to be severely flawed, though this brief review will not allow me to detail all of my critique.

The introduction sets out Enns’s perspective unambiguously. First,

The most faithful, Christian reading of sacred Scripture is one that recognizes Scripture as a product of the times in which it was written and/or the events took place—not merely so, but unalterably so. (p. xi)

Second,

If evolution is correct, one can no longer accept, in any true sense of the word ‘historical,’ the instantaneous and special creation of humanity described in Genesis, specifically 1:26–31 and 2:7, 22.” (p. xiv)

He dismisses all efforts to reconcile Genesis with “evolution” as producing a “hybrid” Adam who is “utterly foreign to the biblical portrait” (pp. xiv–xv, xvii).

In chapters 1–4 (“Genesis: An ancient story of Israelite self-definition”), Enns claims that scholarly study of the origin and purpose of Genesis should keep us from attaching much “historicity” to its creation stories:

The Pentateuch was not authored out of whole cloth by a second-millennium Moses but is the end product of a complex literary process – written, oral, or both – that did not come to a close until the postexilic period. This summary statement, with only the rarest exception, is a virtual scholarly consensus after one and a half centuries of debate. (p. 23, italics his)

Further, the widely acknowledged parallels between the early chapters of Genesis and the mythical tales from other peoples in the ancient Near East show that the purpose of Genesis is to define Israel and her God over against these tales. And since these other tales are “clearly mythical” (p. 37) and therefore unhistorical, why should we treat Genesis any differently?

He goes on to suggest, “Some elements of the [Genesis] story suggest that it is not about universal human origins but Israel’s origin” (p. 65), offering a chart to show how the “Adam story mirrors Israel’s story from exodus to exile” (p. 66). In such a reading, Adam as an actual person is a *misreading*, since he is really “proto-Israel.”

In chapters 5–7 (“Understanding Paul’s Adam”), Enns addresses an obvious difficulty, namely that Paul presented Adam as historical, the first man. Enns’s argument, that Paul’s Adam cannot result from a “straight exegesis” (p. 81) of Genesis, will be familiar to those who have read Enns’s other writings: “What is missing from the Old Testament is any indication that Adam’s disobedience is the cause of universal sin, death, and condemnation, as Paul seems to argue” (p. 82); he contends that this is true both of Genesis and of the whole Old Testament.

Paul “was a first-century Jew, and his approach to biblical interpretation reflects the assumptions and conventions held by other Jewish interpreters at the time” (p. 95). Even though, however, “we” can no longer accept Paul’s take on Adam as the first man (because of both science and historical criticism), “death and sin are still universal realities that mark the human condition” (p. 124).

The final section presents nine theses:

1. Literalism [in reading Genesis] is not an option.

2. Scientific and biblical models of human origins are, strictly speaking, incompatible because they speak a different language. They cannot be reconciled, and there is no “Adam” to be found in an evolutionary scheme.
3. The Adam story in Genesis reflects its ancient Near Eastern setting and should be read that way.
4. There are two creation stories in Genesis; the Adam story is probably the older and was subsumed under Genesis 1 after the exile in order to tell Israel’s story.
5. The Israel-centered focus of the Adam story can also be seen in its similarity to Proverbs: the story of Adam is about failure to fear God and attain wise maturity.
6. God’s solution through the resurrection of Christ reveals the deep, foundational plight of the human condition, and Paul expresses that fact in the biblical idiom available to him.
7. A proper view of inspiration will embrace the fact that God speaks by means of the cultural idiom of the authors – whether it be the author of Genesis in describing origins or how Paul would later come to understand Genesis. Both reflect the setting and the limitations of the cultural moment.
8. The root of the conflict for many Christians is not scientific or even theological, but group identity and fear of losing what it offers.
9. A true rapprochement between evolution and Christianity requires a synthesis, not simply adding evolution to existing theological formulations.

It is difficult to review this book in short compass. Enns covers a lot of ground, his topics are controversial, and I disagree frequently with his judgments. Even more challenging is how hard it is to find extended arguments for Enns’s positions. He tells us that the post-exilic date for the final form of the Pentateuch (and for most of the OT) is the consensus opinion of scholars at research universities; and he gives a standard list of factors that move historical critical scholars in this direction. But other than a nod in the direction of the traditionalists (p. 25, note 22, referring only to Umberto Cassuto [d. 1951] and William H. Green [d. 1900]), he never actually engages the traditionalist counter-arguments.

The presence of a consensus, to which he frequently refers, is not a valid argument. Assuming that the consensus actually exists, one needs to know how it came about, and with what combination of

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persuasion, inculcation, indoctrination, and coercion it is enforced. Further, consensus changes: the contemporary consensus has replaced an older one, and may itself be replaced. Further, I do not know if acceptance of *some* historical critical conclusions entails historical skepticism about Adam and Eve; certainly Enns has not argued the point.

Additionally, surely some acknowledgment of worldview factors would be appropriate when addressing the consensus of scholars in research universities. Is there any link between ideology, method, and conclusions? Enns seems to proceed as if this consensus is value neutral—and perhaps it is (much as I doubt it)—but he should *show* it.

Enns's readings of biblical materials are often simplistic. He shows no awareness of the developments in literary readings of biblical materials—even if he rejects these—with the resulting attention to literary style, and the Bible writers' preference for showing over telling. He also, in common with many in the critical camp, assumes a naïve literalism in reading texts, and equates that with truthfulness. Again, he owes us a discussion of *why* he rejects the notion of rhetoric, phenomenological language, and related concepts. But this assumption is what enables him to dismiss any correlation of biblical Adam with historical-scientific research.

Enns is convinced that “evolution” and “a biblical Adam” are incompatible. But what definition does he assume for those terms? Enns is clear about the second and vague about the first. I cannot tell whether he has a particular notion of what “evolution” is, or if it is a general term for “the results of the modern sciences regarding the antiquity of the cosmos and earth, and the development of life over a long period,” or some combination. Hence the book lacks any discussion of what kinds of evolution he has in mind, or of whether the advocates of evolution all mean the same thing, or whether we laity have any right to evaluate the proffered theories.

Enns's estimate of “biblical Adam” comes from a literalistic reading of Genesis:

The biblical writers assumed that the earth is flat, was made by God in relatively recent history (about 4,000 years before Jesus) just as it looks now, and that it is a fixed point in the cosmos over which the sun actually rises and sets. (p. xiii)

It is the traditionalists' confidence that the biblical story of Adam is intended both to be *referential* (about real persons and events) and *rhetorically artistic*; together with a respect for science, this has motivated them to come up with historical-scientific scenarios

by which to picture Adam and Eve and their progeny. They have challenged naturalistic extrapolations from the scientific theories, much as they have differed somewhat in their judgments of where the naturalism comes in. Affirming the actual resurrection of Jesus, Enns is personally a Christian and not a naturalist; but if he can swallow that camel, why strain out the gnats by approving a naturalistic account of the Bible and of biological origins?

Enns acknowledges that Paul's argument assumes a historical Adam, but does not engage the other New Testament texts that assume this: e.g., the imagery in Rev. 22:1–5 (where God will ultimately remove the effects of the Fall) gets a mention (p. 74), without saying whether it should affect our thinking; and he leaves out Jesus in Matt. 19:3–9, who insists that “from the beginning it was not so.”

In this book, there is no place for any apologetic questions of whether humankind is a *natural* product of evolution or something special, or of whether there is a humankind at all, and of how sin came into the world, of why our souls abhor sin and dysfunction as “not the way it's supposed to be” and yearn for healing—all of which the traditional notions of Adam sought to explain.

This book strengthened and clarified my own thinking when I disagreed. Indeed, I came away even more confident in traditional views of Adam and Eve as our specially created first parents through whom sin and evil came into human experience. If evolutionary theories are opposed to that, then those theories must adapt to accommodate the entire range of evidence.

Reviewed by C. John Collins, Professor of Old Testament, Covenant Theological Seminary, St. Louis, MO 63141.



RELIGION & SCIENCE

SCIENCE IN A DEMOCRATIC SOCIETY by Philip Kitcher. Amherst, NY: Prometheus Books, 2011. 270 pages. Hardcover; \$28.00. ISBN: 9781616144074.

Philip Kitcher is worried. In his latest book, *Science in a Democratic Society*, Kitcher wants to show that there is too much ambivalence about the authority due to natural scientists, and often this is exemplified in controversial science-related public issues, such as genetically modified plants, global warming, or claims about evolution (p. 15). Initially, Kitcher places blame for these problems on “the sweeping

declarations of enthusiastic scientists" (p. 16), scientists who cling to the Enlightenment legacy "that all questions of a specific type can be addressed by future research, or even that all important issues can eventually find scientific resolution," a view Kitcher labels "scientism" (p. 17).

But it turns out that "Scientism" is not the real problem. The loss of the public authority of science is primarily the result of growing belief in an alternative story in which

institutionalized science is dominated by people with biases that oppose the ideas of the folk. Behind the elite universities and the honorary societies [so this view holds] is a subversive agenda, one intent on rooting out popular convictions and values. (p. 19)

If the reader is unsure what group embraces such a story, the reference in the next sentence to "teachers at the Bible colleges" clears things up. Kitcher believes that this never-specified group of Bible believers (he offers not one example of a specific Bible-believing person or idea or institution or work anywhere in the book—a major shortcoming) has uncritically accepted a limited view of the nature of a democratic society, a view which encourages people to think that their democratic freedoms of thought and expression justify their believing as they wish, even in the face of scientific evidence to the contrary. Kitcher notes that the over-enthusiastic scientific scientists inadvertently encourage this view, since such scientists are still in thrall to the empty ideal of a value-free science. Their blindness to the role of values in their science only encourages the alternative story told by Bible believers.

Kitcher, who is the John Dewey Professor of Philosophy at Columbia University, has what at first appears to be an unlikely way out of this dilemma. He recognizes that *both* of these views of science are naïve. In a modern society such as ours, where science impacts (or could impact) more people than ever before, there needs to be an improved way for scientists and citizens to relate one to another, or, in Kitcher's words, integrate "expertise with democratic values" (p. 11).

Kitcher's goal is to avoid the distortion of thinking that there are experts in the public good or the ultimate expert, God. His alternative is a notion of "authoritative conversation, in which *all* participate on *equal* terms ..." (pp. 49–50). This will, of necessity, involve judgments of ethical value, something made too little of by Scientism and too much of by religious believers. For Kitcher, "there are ... no ethical

experts, only the authority of the conversation" (p. 57).

Kitcher is realistic enough to acknowledge that this is an ideal, but he believes that aiming for this ideal is our best hope for citizens and scientists to find common purpose, provided that religious claims are inadmissible. Such claims, says Kitcher, fail because they do not meet "the cognitive conditions on mutual engagement" (p. 60). For Kitcher, the condition means that claims can only be validated empirically. Since religious claims, according to Kitcher, offer no such evidence, their truth claims are therefore based on a "chimeric epistemology" (p. 157). Kitcher characterizes this approach to knowing as willfully and ignorantly believing X without offering any reasons for the belief. Kitcher playfully summarizes his epistemology with a simple rule: "There will be no spooks" (p. 41).

For an author with Kitcher's breadth of reading and understanding of important thinkers such as Thomas Kuhn (with whom Kitcher studied), such claims as this (and they are liberally sprinkled throughout the book) are breathtakingly naïve. Given Kitcher's insistence on the sole validity of evidence-based claims, his virtually complete absence of evidence for these claims is astonishing. For example, I could not detect one single footnote to, or any publication listed in his bibliography by, those unnamed people criticized by Kitcher. Again, Kitcher uncritically adopts an "evolution of ethics and religion" view without apparently having seriously considered the well-developed positions of many anthropologists, historians, and biblical scholars to the effect that religion and ethics have numerous features that cannot be explained by pragmatic evolutionary criteria alone. Especially egregious for a philosopher, he makes no reference to the respectable body of philosophy of science done by Christian scholars such as Del Ratzsch, not to mention the discussion of rationality and belief in God by Alvin Plantinga in his *Warrant* series. The work of the ASA (including this publication) also apparently escapes Kitcher's notice.

Lest this seem too monochromatic a judgment of the work of such a distinguished scholar as Kitcher, consider the following assertion regarding religious believers:

To assert their ungrounded commitment to a particular standard, and to claim that others should abide by policies flowing from it, even when these others repudiate the commitment, would be a dramatic failure of mutual engagement. Ideal deliberation would thus endorse the conclusion that

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methods of certifying claims as part of public knowledge must be thoroughly and completely secular. Public reason can allow discussants to put forward claims that accord with religious beliefs, but *defense* of those claims must be free of any reliance on the tenets of a religious tradition. (p. 161)

Many readers of this journal will immediately recognize what Kitcher misses—that a statement such as this is grounded on assumptions that can only be believed rather than proven. As such, they are beliefs about ultimate, nondependent reality, which are therefore *de facto* religious beliefs.

I would have preferred, as I wrote this review, to have foregrounded Kitcher's case for the impossibility of value-free science. His generous desire to give all citizens, scientists or not, secular or not (or at least their representatives) some way to have a conversation about how to better engage in supporting science for the public good deserved more attention. In the latter half of his nine chapters, Kitcher offers some interesting (albeit brief and very optimistic) analyses of what this could look like. His brief historically rooted exploration of how modern science came to see itself as semi-autonomous is worthy of more attention.

Such would have been my preference. But his standard modern pragmatic secularism (upon which Kitcher's analysis and solution depend) showed him to be so culpably ignorant of the very ideas about which he seemed so deeply concerned, and he so cavalierly ignored his own values of supporting claims with evidence, that this reviewer must judge the book more for its deficiencies than its promise.

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SOCIAL SCIENCE

THE PHYSICAL NATURE OF CHRISTIAN LIFE: Neuroscience, Psychology, and the Church by Warren S. Brown and Brad D. Strawn. New York: Cambridge University Press, 2012. xii + 178 pages. Paperback; \$27.99. ISBN: 9780521734219.

How would the church, the Body of Christ, be impacted if Christians fully embraced their own embodiment as persons? Brown and Strawn look at the implications for spiritual formation and pastoral care of leaving behind anthropological dualism in favor of a theology and practice stressing the person as physical, social and communal.

Neuroscientist Warren Brown is professor of psychology at Fuller Seminary where he mentored Brad Strawn who is now VP for Spiritual Development at Southern Nazarene University. Brown has been influenced by nonreductive physicalism as articulated by Donald MacKay and Malcolm Jeeves, scientists whose writings are familiar to many in ASA. In previous articles and books, Brown has argued on the basis of neuroscientific, psychological, and biblical evidence in favor of this Christian physicalist perspective over the traditional dualistic view, which espouses separation of physical body and immaterial soul. The present book moves beyond those arguments to consider the formative and transformative nature of social relationships on our ever-developing physical brains.

In the first of three sections, the authors argue that the biblical and scientific view of persons is that of a unitary physical, mental, spiritual being embedded within social relationships. Our uniqueness as humans consists in our rationality, relationality, morality, and religiousness, all of which have been linked by neuroscience with our physical brains. Without question, social neuroscience is the fastest-growing area within neuroscience. Using data from fMRI and brain disorders, Brown and Strawn show the connection between our brains and thoughts, including our social pain, empathy, and development of trust. Various neurological disorders can radically disrupt language, the ability to imagine other minds, forethought, and empathy. During the last decade, neuroscience and philosophy have both recognized the role of emotions as a major and useful guide in moral decision making. Although the connection between religious experience and brain activity has been naively discussed in popular and even some scientific literature, it is clear that brain activity is altered during prayer, meditation, and glossolalia. Indeed various religions over the millennia have used brain-altering drugs or practices to induce religious experience. The brain plays a role, but Brown and Strawn point out this role is not associated with one neural area or pattern, and religious experience is conditioned by memory, social context, and beliefs.

Brown and Strawn further describe how persons are formed by complex interactions with the social environment. This open and self-organizational nature of the mind is seen most strikingly in childhood, but continues into old age. The ability to share attention, to imitate others, to develop language and a concept of self, and to be emotionally attuned to others all develop first in the cradle of interpersonal

attachment and can be disrupted by neural disorders or failures of nurturance. Relationships, however, continue to shape us over the entire lifespan because dendritic structure continues to remain plastic throughout life. The authors argue that the church needs to reconsider not only religious development of children, but also the reality of social embeddedness in lifelong spiritual growth. For enduring spiritual transformation to occur, conversion must be followed by progressive development, which in normal human life is facilitated by social relationships.

In the second section, the authors explicate the roles that attachment, imitation, and narrative play in childhood development and the further roles they might play in the spiritual formation of adults. In complex dynamical systems theory, it is at the point when a system becomes destabilized and is unable to successfully interact with the environment that reorganization and emergence of new systems most readily occur. The authors compare these events, referred to as catastrophes in systems theory, to conversion and ongoing experiences of spiritual transformation. Already in the 1950s, British psychologist John Bowlby showed that secure attachment in childhood leads to flexible healthy interpersonal behavior, but we now recognize that secure relationships can also bring healing and reorganization of behavior to adults. Psychological data show that both children and adults unconsciously imitate not only behaviors of others, but also their desires, motives, goals, and attitudes. Brown and Strawn relate the mimetic theory of René Gerard to this phenomenon to show how we shape each other through reciprocal imitation. Psychological research also suggests that people adopt narratives or scripts as children in order to organize their social relations, and that healing can be facilitated by adoption of more coherent narratives. The authors invoke Alasdair MacIntyre's view that persons flourish only in the context of their interdependence. The development of wisdom and virtue requires feedback and error correction from others, they argue, more than disembodied mysticism

The third section deals specifically with church bodies, the need of bodies for churches, and practical considerations of embodied spirituality. Mastery of behavior requires more than focus on the inner "me." Learning how one impacts other people allows development of self-observation and new behaviors. Caring, committed long-term relationships can disaffirm people's anticipation of rejection and allow development of new attachment styles.

A new template for behavior can form as a result of corrective recapitulation of early family groups. In the right kind of church community, people can serve as role models, reciprocal partners for growth, and mirrors which allow us to discover our identity. Unfortunately most church groups, as Brown and Strawn point out, are focused on more superficial social interaction and/or Bible study and not characterized by longer-term covenants of caring and commitment to correctively speak into each other's lives. A common involvement in ministry together allows development of new outward-oriented attitudes toward service.

In churches where the emphasis is on passive "experience" rather than service, a sort of Gnostic subjectivism can too easily develop. Brown and Strawn advocate active physical participation in worship and liturgy, in particular the physical, participatory, communal activity of the Eucharist. There are additional implications for how congregations deal with various physical, emotional, and mental disabilities. The embedded view sees salvation and sanctification as the turning of the whole person to Christ in transformation of the entirety of life and behavior. Because people change in and through relationship, Christian formation takes place with and is emergent from the ongoing life of the interactive community as Christ operates through his body.

I highly recommend this book for leaders and lay members of congregations, as well as students at Christian colleges. The relevant research is presented in readable form, and should be easily accessible at a beginning undergraduate level. The authors not only extend the understanding of the present neuroscientific and psychological understanding of human beings, but integrate it with practical wisdom for church organization.

References within the text are covered in footnotes, and there is an adequate index. In spite of the number of citations provided, the role of relationship in moral development is one area which might have included more reference to other work.

Reviewed by Judith Toronchuk, Trinity Western University, Langley, BC V2Y 1Y1. ☞



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Letters

“Hard” and “Soft” Methodological Naturalism

I very much enjoyed Kathryn Applegate’s article (“A Defense of Methodological Naturalism,” *PSCF* 65, no. 1 [2013]: 37–45) defending methodological naturalism (MN). I share her enthusiasm that MN can help to shed light on the mechanism of God’s handiwork in nature, as opposed to previous intimations that MN is somehow inconsistent with God’s creative agency. I do not think that MN is the methodological extension of metaphysical naturalism. Indeed, if atheism were true, it would undercut both our reason and our ability to do science in the first place!

One issue that I was hoping Applegate would address, but that did not appear in her article, was the contrast between “hard” and “soft” MN. This is a distinction first made by English philosopher Peter S. Williams, and is one that I find very helpful. In short, the difference is this: “hard” MN precludes intelligent causation from science, whereas “soft” MN precludes explicitly supernatural causation from science, while still allowing for explanations to be framed in terms of intelligence. Williams argues that “soft” MN should be permissible in science—and, indeed, *is* permissible in science, given such widely recognized fields of investigation as forensics, archaeology, and SETI. I cannot help but feel that he is on to something.

Although Applegate does not directly address the distinction between “hard” and “soft” MN, she does brush the issue tangentially. She writes, “By practicing methodological naturalism, one does not deny the presence of design or teleology in the created order but simply removes it from the purview of science” (p. 43). Here, Applegate appears to advocate some form of “hard” MN, whereby appeal to intelligence is disallowed a priori. That is certainly her prerogative, although I wonder whether she truly believes that none of the aforementioned disciplines are scientific in nature because they, too, invoke intelligent causes.

To be clear, I remain unconvinced by the recent Intelligent Design movement, particularly as it purports to explain the origin of biological diversity. However, I do find the “hard” version of MN to be problematic, and I think that we limit ourselves needlessly by adhering to it for Applegate’s fear of “demeaning God.”

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Clarifying “Hard” and “Soft” Methodological Naturalism

I am grateful for Jordan Mallon’s question regarding the distinction between “hard” and “soft” methodological naturalism (MN), the former being that which precludes *all* intelligent causation, the latter precluding only supernatural causation. I agree that hard MN is problematic. In my article I wrote that “these fields [archaeology, forensics, SETI] do abide by the traditional definition of methodological naturalism, *which only excludes supernatural explanation, not all intelligent causes*” (p. 40, emphasis added). The version of MN I hoped to defend in my article (“A Defense of Methodological Naturalism,” *PSCF* 65, no. 1 [2013]: 37–45)—what I called “traditional” MN—is indeed “weak” MN.

Mallon questioned whether I meant to exclude *all* intelligent causation when I wrote, “By practicing methodological naturalism, one does not deny the presence of design or teleology in the created order but simply removes it from the purview of science” (p. 43). I am happy to concede that my wording could have been more careful: make that “*supernatural* design or teleology.” My intent was that nonscientific avenues for thinking about design and teleology (e.g., biblical ones) are likely to be more fruitful, in many cases.

Kathryn Applegate
ASA Member

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