General Sciences

WEIRD LIFE: The Search for Life That Is Very, Very Different from Our Own by David Toomey. New York: W.W. Norton and Company, 2013. 221 pages, endnotes, works cited, index. Hardcover; $25.95. ISBN: 9780393071580.

Weird Life by David Toomey is a wide-ranging exploration of what defines life as we know it and as we don't know it. Life as we don't know it is "weird" by Toomey's definition, and he takes the reader on a fascinating journey starting with extreme environments on Earth as studied by microbiologists and ending with mind-bending multiverses as theorized by astrophysicists. In between the two extremes, Toomey treats the reader to some history of science, the basic chemistry of life, possible alternatives to life as we know it, artificial intelligence, quantum mechanics, and a comprehensive look at life as portrayed in science fiction. His speculations are well researched, and he manages to ask some fundamental questions about the nature of life along the way. By delighting his audience with life at the extremes, Toomey leads the reader to ponder about all of God's creations, not just those normally within our thoughts.

Toomey sets the groundwork for his discussion of "weirdness" by outlining the parameters defining the carbon-based, water soluble life that we find on Earth. He makes the process easy by introducing the reader to the biologists who have studied life on earth in extreme environments (hot, under pressure at the bottom of the ocean, or both). He gives the reader enough historical background to understand how revolutionary the discoveries of life at the extremes were in their time. To keep his narrative dynamic and exciting, Toomey jumps from the present to 1977 to 1922 to 1830 to 1957 to 1964 and back to the present. Rather than simply presenting dry facts, he puts the information in interesting context and introduces the scientists in a personal fashion as he makes the case for weird life on Earth.

Since Toomey's weirdness is "life that is very, very different than our own," he next sets out to define what chemistries are essential to our life so that he can explore the possibilities of life based on alternative life chemistries. We learn about solvents, stability, and substitutions in the macromolecules that make up not only familiar life but also what we might encounter in weird life. Perhaps, he opines, the accidental chirality of our macromolecules "set the stage" for life as we know it, and alternate forms of life could easily exist.

Throughout the book, readers are asked whether we would recognize weird life if we encountered it, describing in great detail vignettes from over more than 50 years of NASA's experiments and explorations from Viking to Voyager to SETI. His thesis is that weird life is not likely to be the English-speaking stranger from science fiction, but rather more likely either some rudimentary life form based on an alternate chemistry or sophisticated machinery left by a long-gone society.

Given that some of his speculations sound like science fiction, Toomey acknowledges and embraces this, sprinkling science fiction references throughout the book and devoting an entire chapter to how various authors' imaginations have shaped our view of hypothetical life. Even nonscience fiction buffs will enjoy his witty analysis of the life forms dreamed up by literary giants and should appreciate the science on which these fictional characters are (or are not) based.

The latter part of Toomey's book is devoted to quantum mechanics and the multiverse, subjects a bit less accessible to most biologists. He explains them in a straightforward way, interweaving the science with personal stories in an interesting manner. Toomey is of the opinion that it is the astrophysicists, those who don't really know as much about life here on Earth, who can best imagine alternatives to life as we know it, weird life.

Weird Life is well researched, well documented, and compelling to read. By exploring all of God's creation, it can start a conversation on the creation mandate, humanity's call to care for all creation. It is a synthesis of scientific reporting and speculation that draws the reader in with its clear conversational style. I highly recommend this book to high school students, college students, grown-ups, and anyone interested in science.

Reviewed by Monica Lee Tischler, Professor of Biology, Benedictine University, Lisle, IL 60532.

THE FOREST UNSEEN: A Year's Watch in Nature by David George Haskell. New York: Viking, 2012. 288 pages, bibliographical references, and index. Paperback; $16.00. ISBN: 9780143122944.

In his first book, *The Forest Unseen*, David Haskell begins every chapter in exactly the same spot, but takes you on a flight with his words. The entire "story," as it were, takes place in a mandala-sized patch of old-growth forest in Tennessee. But during each of his regular visits to the mandala—three or four

recorded dates each month for a year—he looks anew at this space. He sees not only what is before him, but also reaches out across space and time to make connections to everything from the strands of fungi in the soil to the fungi in the gut of a ruminating deer, from bees visiting flowers in the early spring to the migrating birds visiting in the fall.

Reading this award-winning text (finalist for the 2013 Pulitzer Prize in General Nonfiction, winner of the 2013 Reed Environmental Writing Award, winner of the 2012 National Outdoor Book Award for Natural History Literature), you will be transported from the central US into the past, when giant ground sloths and woodland musk oxen grazed in the forest, then to the present, where you will view the forest from the viewpoint of a bee or a caterpillar or a maple tree or even a shrew (at which point Haskell reminds us that the earliest mammals on Earth were shrew-like, drawing connections to our own everyday existence in a jest). You will get caught up in Haskell's creeping and crawling on the forest floor, getting closer looks at tiny mosses, fragile spring flowers, and the "bestiary" in the soil. You will worry as you read about his short experiment with experiencing the January cold as animals do (minus a coat and boots, and, well, more than enough to worry an empathic reader) or as he mentions, briefly, a trip to the hospital where he receives aspirin (derived from the bark of willow trees and meadowsweet leaves) and digitalis (derived from the leaves of foxglove) that leave him looking around at the forest and noticing the potential for pharmacology therein.

The Forest Unseen is arranged in forty-three chapters, each with a date (from January 1 to December 31) and a one- or few-word title that gives a good clue about the focus: Salamander is on February 28, Chainsaw on April 2 (spoiler: fortunately, found in the golf course that looks over the forest, and not the forest itself), and Sharp-shinned Hawk for November 15. Each chapter is under ten pages long, making this an easy book to read in pieces. In fact, one or two short chapters at a time may be the best way to approach *The Forest Unseen*, as Haskell fills the pages with enough natural history and ideas to make it well worth taking time to consider them before moving on to the next section.

The text includes a bibliography that is not meant to be exhaustive but will allow readers to find more information on any topic they find interesting. Many of the entries are scientific journal articles, but there are books and textbooks and even literary references, indicative of the breadth of the ideas in this book. Citations are not included in the text itself; this seems appropriate, as the writing is more contemplative than technical in most places.

Like Thoreau or Muir or other master nature writers, Haskell will take you into the forest and show you the world that is hidden there, just beyond your view. Anyone interested in the natural world will find jewels in this worthy and well-written book. Just be sure to make time to go outside after you've read it, so that you can experience the world in your backyard anew.

Reviewed by Cheryl Heinz, Associate Professor of Biological Sciences, Benedictine University, Lisle, IL 60532.

History of Science

THE LIFE OF DAVID LACK: Father of Evolutionary Ecology by Ted R. Anderson. New York: Oxford University Press, 2013. x + 246 pages, index. Hardcover; $59.00. ISBN: 9780199922642.

Reviewing a *festschrift* for the Oxford University entomologist E. B. Ford, Harvard geneticist Dick Lewontin notoriously wrote that many British scientists come "from the fascination with birds and gardens, butterflies and snails which was characteristic of the prewar upper middle class." David Lack could have been the sort of person Lewontin had in mind. Born in 1910 to a London surgeon and the daughter of an Indian Army officer, he was educated at a private school and at Cambridge University. There is no doubt that he had a fascination with birds from an early age. He wrote three ornithological papers in the year he went to university to read zoology. During and after completing his undergraduate degree in 1933, he took part in several ornithological expeditions; he became a schoolmaster; he next enjoyed a career-changing four months on the Galapagos Islands in 1938–1939, writing a much-quoted book on *Darwin's Finches* from his work there. After military service, he became Director of the Edward Grey Institute of Field Ornithology in Oxford in 1945, remaining in that post until his premature death from lymphoma at the age of 62.

Lack's biography has been written by Ted Anderson, himself a distinguished ornithologist. It is a very readable account of a family man with limited social skills who made some of the most significant discoveries about natural populations of animals in the twentieth century, particularly the factors affecting reproduction rates, based on his extensive studies and knowledge of birds in many parts of the world. (His last—posthumous—book was *Island Biology Illustrated by the Land Birds of Jamaica*, prompted

by Lack's skepticism about some of the conclusions of MacArthur and Wilson's *Theory of Island Biogeography*.) Anderson's work is structured around the thirteen books authored by Lack.

The reason that David Lack is relevant for readers of *PSCF* is that one of the thirteen books was *Evolutionary Theory and Christian Belief*, published in 1957. Lack was raised in a nominally Christian home, but he enjoyed singing and regularly attended chapel in his Cambridge college. However, he claimed to be an agnostic until 1948, when Armstrong records that he was converted under the influence of friends from his school-teaching days. He was confirmed in the Church of England in 1949. Anderson does not tell us much about the details or development of Lack's faith, but he must have been known as a Christian because, in 1953, he was invited to contribute to a lecture series on "Theology and the Future of Science." Encouraged by Nobel Laureate Peter Medawar, he expanded his lecture into *Evolutionary Theory and Christian Belief*.

Lack was conscious of his loneliness as both a Christian and an evolutionary biologist and was nervous about the reception of the book. In its preface, he records that he sent his manuscript to no fewer than nine friends, "Roman Catholic, Anglican, Quaker, and agnostic, biologist, philosopher, priest and layman." His Royal Society obituarist, W. H. Thorpe, a Gifford Lecturer, pioneer ethologist, and Quaker (and one of Lack's nine friends), wrote that I "discussed [the book] extensively with him since I am one of a considerable number of biologists who are convinced that religion and science (especially biology) can and must be brought together in one harmonious scheme of thought." Thorpe continued, "David ... seemed somehow able to embrace simultaneously both evolutionary theory and a conservative and somewhat limiting interpretation of what he regarded as orthodox Christianity."

Lack's book is a key building block in the modern phase of the Christianity and evolution debate, a debate which still rumbles on more than half a century later. Its significance is that it was probably the first account of the debate from a scientist of his calibre and concentrates on scientific rather than sociological questions. Thorpe notes that "there is no doubt that the work served a valuable function in clearing the air and bringing what some feel to be basic differences into broad daylight." Lack's own conclusion is worth repeating:

> All should accept the findings of science … On the other hand, it is important that the claims made by scientists in the name of science should relate to genuinely scientific matters, and that when they really refer to philosophical problems, those should be made clear. In particular the claim that man has evolved wholly by natural means is philosophical and not scientific.

Anderson suggests that Lack "seemed to hold a dualist view, accepting the fundamental contradictions between the conceptions of man inherent in evolutionary biology and in Christianity, but asserting that both have great value in our attempts to understand our lives and our place in the universe" (p. 126). Many still wrestle with the same dualism.

Lack produced a second edition of his book in 1961, reporting on new findings of fossil hominids and reacting (unfavorably) to Teilhard de Chardin's *Phenomenon of Man*. He returned to the question of human nature in the context of T. H. Huxley's views in a volume of collected essays (*Enjoying Ornithology*) published in 1965, but died before publishing any development of his ideas. There is much one would like to know. Was Lack influenced by the mathematician Charles Coulson, an Oxford colleague and contributor with Lack to the "Theology and the Future of Science" series? Coulson was well known at the time as the author of several influential works (*Christianity in an Age of Science*, 1953; *Science and Christian Belief*, 1955; *Science, Technology and the Christian*, 1960). Anderson tells us that Lack had "difficulties in understanding the place of miracles in a scientifically informed world view." How did he regard the Resurrection, the supreme miracle?

Anderson has written an entertaining and informative account of one of the leading biologists of the twentieth century; it will undoubtedly be read widely by ornithologists and animal ecologists whose science was significantly influenced by the middle-class Englishman who was fascinated by birds. The biography is not an analysis of the beliefs of that biologist, but Lack's faith was obviously important to him and is clearly proclaimed in the book. We should all be encouraged that such a man was an unashamed Christian.

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Medicine

THE HEALING GODS: Complementary and Alternative Medicine in Christian America by Candy Gunther Brown. New York: Oxford University Press, 2013. xii + 336 pages. Hardcover; $29.95. ISBN: 9780199985784.

This book has been published at the right juncture in time as people in the United States debate upcoming changes in national healthcare policy. Complementary and alternative medicine (CAM) has emerged as a prevalent alternative treatment option for many individuals. In 2007, the National Health Interview Survey from the National Institutes of Health found that 38% of adults and 12% of children in the United States used some form of CAM.[1] The high prevalence of CAM use suggests that we need to define more adequately what major CAM categories exist in the United States, especially in regard to clinical efficacy (or lack of), and what background framing such techniques (including spiritual concepts) is involved. Brown's book, *The Healing Gods*, appears to fit the bill.

The book is organized into eight chapters followed by a lengthy conclusion. One of the main aspects of the book is a concentration on the rather recent incorporation of CAM into the culture of evangelical Christianity. In particular, many of the metaphysical aspects of CAM that come from other religions (such as Hinduism) have been co-opted by Christians. The book begins by discussing the potential religious connotations of CAM. Brown rightly points out that many practitioners of CAM define its use as spiritual, as opposed to religious, in order to provide a marketing basis for Christians. CAM practitioners also can describe what they do as scientific, as opposed to religious, in order to appeal to non-Christian entities such as hospitals.

Yoga, in particular, is reviewed extensively as an example of how CAM practices can be co-opted by Christians. The history of yoga is described in very good detail as an expression of Hinduism that started as early as 800 BCE. A significant debate exists in evangelical Christian circles as to whether yoga should be practiced, due to its non-Christian historical roots. The book provides a good discussion regarding the controversy of using yoga, including Pilates, in the Christian community. Brown then continues to give an objective discussion of the pros and cons of Christian CAM use. As I read through this section, I felt the book provided a good understanding of the concerns expressed by Christian leaders regarding CAM. As an example, one issue concerning which Christian churches and leaders express consternation is a "… lack of scientific evidence that CAM is effective or works through scientifically plausible mechanisms" (p. 75).

Other important chapters discuss specific subjects, including chiropractic (chap. 4), acupuncture (chap. 6), and energy medicine (chap. 8). As a physician, I found these chapters to be most helpful since patients will often advocate for these specific CAM uses in conjunction with standard medical care. Healthcare providers should know how these ideas are being utilized. Again, it is made clear in these chapters that such concepts do not have a Christian origin. For example, chiropractic founders such as B. J. Palmer proposed that this form of CAM is a form of religion that is separate from Christianity. I was happy to see Brown point out that up to fifty percent of chiropractors do not accept vaccinations as valid. It should be made quite clear that the anti-vaccination line of thinking is extremely dangerous. In a similar manner, Brown reviews energy medicine techniques, such as Reiki and therapeutic touch, which also have non-Christian origins and have been marketed to be, at various times, Christian or part of mainstream medicine.

Brown is effective in explaining why CAM continues to have pervasive use despite the practice of evidence-based medicine, which has led modern medical advances over the past 100 years (chap. 5). She discusses in appropriate detail concepts that non-medically trained people should be aware of, including defining Cochrane reviews, reviewing aspects of a good clinical trial, and describing what makes an appropriate journal publication. However, the best part of the book is the thirty-page conclusion entitled "Why Does It Matter If CAM Is Religious (and Not Christian)—Even If It Works?" This section alone is worth the book's price. Significant discussion is spent on informed consent, the lack of disclosure by some CAM providers about care that might go against a patient's belief system, and the very real concern that engaging in certain CAM practices may lead to changing a patient's religious belief system without providing appropriate informed consent.

The use of CAM by medical providers and hospital systems is a tricky issue. Unlike standard medical care, there is often a lack of standardization and research to back up the success claims offered by some CAM providers. For example, herbal supplements sold in North America have been shown to have poor quality control and high rates of contamination.[2] However, patients may prefer to have certain CAM aspects available for their outpatient and inpatient care, and medical models continue to be developed to bring such therapy to hospital-based care.[3] The only criticism of this book is that more information should have been made available regarding the unscientific and unethical anti-vaccination theories that have been propagated by some CAM providers. Indeed, a large percentage of unvaccinated Americans have "philosophical objections" to vacci-

nation, which include some church groups who have strong anti-vaccination beliefs.[4] I am hopeful that future editions of this book can include a discussion of this important issue.

I highly recommend this book to medical providers who wish to know what aspects of CAM are used by their patients, and to individuals with no medical training who are considering CAM as part of their medical regimen.

Notes

[1]P. M. Barnes, B. Bloom, and R. L. Nahin, "Complementary and Alternative Medicine Use among Adults and Children: United States, 2007," *Natl Health Stat Report* 12 (2008): 1–23.
[2]S. G. Newmaster et al., "DNA Barcoding Detects Contamination and Substitution in North American Herbal Products," *BMC Med* 11 (2013): 222.
[3]L. Knutson et al., "Development of a Hospital-Based Integrative Healthcare Program," *J Nurs Adm* 43 (2013): 101–7.
[4]*Los Angeles Times*, http://articles.latimes.com/2013/sep/12/science/la-sci-sn-cdc-measles-vaccines-20130912.

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Origins & Cosmology

THE THREE FAILURES OF CREATIONISM: Logic, Rhetoric and Science by Walter M. Fitch. Berkeley, CA: University of California Press, 2012. 194 pages, index. Paperback; $26.95. ISBN: 9780520270534.

Walter Fitch was a professor of ecology and evolutionary biology at University of California, Irvine until his death in 2011, shortly before the publication of this concise book. The author describes his target audience as advanced high school or early college students, "who have no irrevocable position on at least some of the differences of opinion between creationists and evolutionists," and who are presumably Christians. The title of the book is therefore appropriate in that the target audience is made up of those who would be intrigued by it rather than those who would be offended.

Fitch's identification with materialistic methods and evolutionary theory and his belief that opposition to them is illogical is clear throughout. Those who are not particularly interested in logic as the ultimate authority on this matter likely will not find his arguments compelling. I believe he is mostly successful at pitching his content at the target level throughout the book. Extensive science background on the reader's part is not necessary, though acquaintance with genetics and fossil basics will be helpful.

The book comprises 150 pages of text divided into four chapters: (1) an introduction to logic and rhetoric; (2) "the basics"—categories of knowledge and belief; (3) math and statistics relevant to genetics, dating and other methods used in scientific study of genetics and fossils; (4) arguments put forth by young earth creationists (YEC) for their position and against evolutionary biology. The chapters are further divided into as many as twenty sections of varying lengths, an organizational style that gives the book an unwieldy feel, like an outline of a book rather than of a fully realized work. These lists of ideas, especially in the final two chapters, cover a large amount of ground, some of it rather shallowly with few references. The interested reader/student might therefore use this book as a jumping-off point for further research, rather than using it as the final word on any given subject. The end matter includes a generous glossary for those unfamiliar with the genetics terminology presented, references, and an index.

The first two chapters set the stage by presenting the logical framework and definition of terms the author will use throughout the book to meet his goal as stated at the beginning of the first chapter:

> to establish what science is and how biological evolution is a scientific study … even if Darwinian evolution itself should be proven wrong. In contrast, creationism, intelligent design, and irreducible complexity are not scientific, even if their conclusions … were shown to be all correct. (p. 2)

Chapter one is an introduction to logical methods and logical fallacies, and the author uses this framework to explain several arguments used by YEC advocates against biological evolution in this and subsequent chapters. While this chapter can be a bit tedious for the casual reader, it is essential to the author's purpose and is a unique aspect of this book. Examples are presented, and the writing is clear and easy to understand.

In chapter two, a great variety of terms are defined, again as groundwork for later chapters: seven ways of knowing, four mutually exclusive areas of knowledge, types of creationist beliefs, a definition of science, definitions of the terms "definitions," "facts," and "theory," and finally an explanation of why biological evolution should be understood to be a "fact." Most of these sections include a discussion of common issues between creationists and evolutionists (logical issues with social Darwinism, what creation-

ists and evolutionists mean when they refer to evolution as a "theory," etc.).

Chapter three, entitled "Some Simple Math and Statistics," presents the way scientists see the age of the earth and how it came to be populated with species. Sections on the scientific method, methods of dating fossils and the earth itself, the gaps in the fossil record, and natural selection are presented from a naturalistic point of view, and occasionally points on which this view differs from YEC arguments are also discussed. The author is more at home with the materialist side of the arguments, and aims only to illustrate that YEC arguments are unscientific. Discussions of these points of contention may not be convincing or satisfying for readers who take issue with the accuracy of the methods presented or do not believe that scientific reasoning is the highest standard of truth. Fitch uses Occam's razor liberally as the arbiter of truth in illustrating how data and statistics should be interpreted by scientists. How young earth creationists might incorporate such science into their worldview alongside their faith is not discussed. Students will emerge from this chapter, however, with a better understanding of what "truth" means to a scientist, and the ever-present statistical uncertainty that necessarily remains in the interpretation of any given set of data.

In the final chapter, Fitch presents a long list of YEC arguments both for their beliefs and against evolution. The author rebuts several of these, including literal interpretation of Genesis 1 and 2, intelligent design, irreducible complexity, and gaps in the fossil record. It is here that the primary goal of the book, to show that creationism is unscientific, is achieved. Students who are curious about what a scientist thinks about creationist beliefs will find ideas that they can explore further. The tone of the writing is mostly even-handed, but the arguments may still be difficult for a nonscientist who has strong creationist beliefs to swallow. However, the author believes that even such Christians should at least consider these questions: the epilogue is a quotation from St. Augustine's *The Literal Meaning of Genesis* in which the great bishop suggests that Christians would do well to refrain from talking nonsensically about science to nonbelievers who know it well, as this may convince those nonbelievers that the Bible itself is likewise untrustworthy. While it is unclear whether the author is himself a Christian, I believe he does a good job of attempting to come alongside the Christian reader.

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Religion & Science

GOD IN PROOF: The Story of a Search from the Ancients to the Internet by Nathan Schneider. Berkeley, CA: University of California Press, 2013. 272 pages. Hardcover; $34.95. ISBN: 9780520269071.

> I think there is no suffering greater than what is caused by the doubts of those who want to believe … A faith that just accepts is a child's faith and all right for children, but eventually you have to grow religiously as every other way, though some never do … It is much harder to believe than not to believe. If you feel you can't believe, you must at least do this: keep an open mind. Keep it open toward faith, keep wanting it, keep asking for it, and leave the rest to God. (Flannery O'Connor, *The Habit of Being: Letters of Flannery O'Connor*)

God in Proof is a fascinating book about that experience of doubting, wanting to believe, wanting not to believe, believing, and not believing. Specifically, it is an historical survey of the search for proofs of God's existence, but such a description by itself might make the book sound like an academic yawner, good only for those studying historical apologetics or the philosophy of religion. It is anything but. Schneider is a very young journalist (only twenty-nine at time of publication), editor at KillingTheBuddha.com and WagingNonviolence.org, author of articles on faith and culture in popular magazines and of *Thank You, Anarchy: Notes from the Occupy Apocalypse* (published only three months after this book by the same press). That kind of résumé might lead one to the opposite conclusion—that, instead of being an academic yawner, the book is a shallow and trivial treatment of a longstanding and complex topic. Again, it is anything but.

What Schneider has produced is better than either of those options. First, the book is erudite; he is remarkably well acquainted with the topic, from the writings of the ancient Greeks to the arguments of medieval Arab philosophers, from the skeptics of the Enlightenment era to the champions of a vigorous theism among twenty-first-century evangelicalism. At times the book reads like a collection of conversations from late-night talk shows, as he brings one thinker after another to the forefront and gently, respectfully engages their ideas before moving on. When he discusses contemporary thinkers, he is more than likely to include personal details—what they were wearing when he interviewed them, what they say about each other, what they like to eat or drink when talking philosophy, religion, or both.

One puts the book down with a sense of the personality of William Lane Craig or Richard Dawkins, not just their ideas.

But the personality that pervades the entire text is the author's own. And this is what turns a good book into an absorbing and compelling tale of personal faith, for Schneider intersperses his historical narrative with the story of his own faith journey, including his conversion to Catholicism and his continuing, lingering questions even as a person of faith. The autobiographical content is, like the historical narrative, respectful of the reader. Schneider's approach strays from the self-indulgent; these are not Facebook posts of "why I believe and you must also." There seems to be little in the way of overt agenda; the book is not written to convince anyone of belief or unbelief. If anything, the intent may be to assist those who have drawn battle lines on this issue to understand each other better, to regard each other with more generosity of spirit and to offer each other more hospitality in the debate over ideas.

The book has its oddities. The slightly off-beat index at the back of the book (arranged chronologically, not alphabetically) lists nearly one hundred individuals who have "proffered proofs about the existence of God" and who are discussed in the book (complete with page numbers). It is an impressive and eclectic list that includes Plato, Ibn Rushd, Maimonides, Aquinas, Spinoza, Pascal, Voltaire, Hume, Kierkegaard, Kurt Gödel, Bertrand Russell, C. S. Lewis, Henry Morris, Alvin Plantinga, Richard Swinburne, John Polkinghorne, William Dembski, Richard Dawkins, William Lane Craig, Bill O'Reilly, and Kirk Cameron, among others. Inexplicably missing, however, are several significant individuals familiar to readers of *PSCF*, such as Francis Collins (former head of the Human Genome Project), Owen Gingerich (former professor of astronomy at Harvard) and even Alister McGrath (scientist, turned noted theologian).

He redeems these absences with a very handy "table of proofs" for and against the existence of God, divided into eight categories (cosmological, dialectical, historical, ontological, phenomenological, sociological, teleological, and transcendental), each with its own subset (e.g., teleological includes "from fine tuning," "from intelligent design," "from language," "from providence," and "from unintelligent design"), and each subsection includes a brief summary and the relevant page numbers from the text. It is both handy and helpful.

After discussing mostly ideas for 230 pages, Schneider closes the book by reminding us that this topic is about more than that in the end. Ultimately, there is a deep mystery at work whenever one attempts to know about God, much less know God, and it is obvious that Schneider's faith is not merely intellectual assent to the idea of God. He has what Michael Polanyi called "personal knowledge." He has had experience with this deep mystery, and there is a knowing in such experience that can be understood only by others who have gone there themselves. Schneider thus concludes by offering his own proof, or something less than a proof but perhaps the best that can be done by finite, imperfect humans contemplating Infinite Perfection—that knowing God is a special kind of sight, a gift even. "The proofs can be explained and taught and respected from a distance, yet there still remains the fact that you either grok it or you don't, and that's that" (p. 229). And that is not terribly far removed from the admonition given by Flannery O'Connor: "Keep asking for it, and leave the rest to God."

Reviewed by Anthony L. Blair, President and Professor of Church History, Evangelical Theological Seminary, Myerstown, PA 17067.

Science & Biblical Studies

READING GENESIS 1–2: An Evangelical Conversation by J. Daryl Charles, ed. Peabody, MA: Hendrickson, 2013. xxi + 240, with scripture index. Paperback; $24.95. ISBN: 9781598568882.

Origins questions continue to generate controversy today, particularly among conservative evangelical Christians. Unfortunately, an adequate understanding of the interpretive issues involved in reading the early chapters of Genesis rarely informs popular debates. Reading *Genesis 1–2: An Evangelical Conversation* brings careful, deeply informed, and leading biblical scholarship to bear on identifying and analyzing such issues, and is thus a welcome contribution.

The book presents five views on interpreting Genesis 1–2, each of which receives a chapter-length treatment written by a representative Old Testament scholar followed by brief (typically 2–4 pages) critical responses from the other four scholars.

Richard A. Averbeck presents the first view, which he calls the "literary day, inter-textual, and contextual reading." His view is "literary" because it seeks to pay close attention to literary features such as grammar, genre, and discourse; it is "inter-textual"

because it seeks to read the creation account in light of the entire canon (he devotes considerable space to reading Psalm 104 and the days of Genesis 1 in light of each other); and it is "contextual" because it seeks to account for the ancient near eastern (ANE) historical context within and against which God spoke. Averbeck's overarching view is that Genesis 1–2 describes the actual creation of the cosmos *expressed analogically*. Genesis 1 focuses on the universe as a whole and describes the creation of its parts phenomenologically in terms that ancient people could observe and understand. Its purpose is to teach the people of Israel to understand their lives as framed by the God who created and ordered the world. Genesis 2 then provides a more standard literary narrative which, unlike Genesis 1, contains recognizable historical markers (e.g., the Tigris and Euphrates rivers; Adam and Eve as historical individuals).

The second view is a "literal approach" endorsed by Todd S. Beall, which interprets Genesis 1–2 as a historical account of God creating the world in six literal twenty-four-hour days. Beall argues, first, that we should not use two different hermeneutics for reading Genesis (chaps. 1–11 vs. chaps. 12–50), but employ one hermeneutic consistently (he does not recognize that one consistent hermeneutic can identify various forms of literature in Genesis). Second, we should not separate the first two chapters of Genesis; both are narrative accounts, not poetry (the respondents point out that narratives can be fictional yet true, e.g., parables). Third, Genesis 1 does not represent an ANE worldview and admitting otherwise would compromise the uniqueness of scripture as God's Word. Fourth, the New Testament writers refer to Genesis as a literal account of actual history. Finally, nonliteral views are motivated by a desire to capitulate to modern scientific theories. Beall fears that figurative approaches initiate a slippery slope of reinterpreting the Bible in light of modern biases.

The third view, presented by C. John Collins, seeks to read Genesis 1–2 "with the grain" and accordingly treats the six days of creation as *analogical days*. Collins reads Genesis 1–11 as "prehistory," which involves recognizing historical features of the text but "without undue literalism." Genesis 1:1–2:3 forms a preface to the book written as "exalted prose narrative." Its chief (but not sole) observation is that GOD made us all! Specifically, God made all things: (a) from nothing; (b) by the word of his power; (c) in the space of "six days" (representing the pattern of a human work week); (d) very good; (e) so that creation bears God's imprint; and (f) as the right kind of place in which we live out our story as human beings and as God's people. Collins argues that we should read Genesis 1–2 together and presents evidence that the two accounts are coherently linked (citing the immediate context, rabbinic tradition, and the broader biblical canon).

In his chapter, entitled "What Genesis 1–2 Teaches (and What It Doesn't)," Tremper Longman III offers the view that "the main purpose of Genesis 1–2 is to proclaim in the midst of contemporary counterclaims that Yahweh the God of Israel was the creator of everything and everyone." Further, the Bible does not intend to explain *how* God created the cosmos or human beings (the Old Testament presents multiple, differing descriptions of creation). Longman suggests that Genesis 1–2 is "theological history" written as "high style literary prose narrative." For example, it teaches that the Lord of Israel is the GOD who created all things; that God is other than, yet involved with, creation; and that human beings are a part of creation, yet also have a special relationship with God and serve as God's representatives. Longman also offers very helpful theological reflections on the relationship between science and exegesis, the doctrines of the perspicuity and sufficiency of scripture, and how to interpret Adam and Eve in light of modern science (biblical inerrancy does not require the affirmation of a historical Adam).

John H. Walton presents the fifth and final view, which reads Genesis 1 as ancient cosmology. He begins with some comments about what it means to read the Bible competently, ethically, and virtuously. He then proceeds with his thesis that Genesis, being an ANE text sharing an ANE cosmological worldview, should be interpreted in light of a functional rather than a material ontology (in a functional ontology, "to be" is to have a function and place in an ordered cosmos). In light of this reading, days 1–3 of creation record God creating the basis for the functions of time, weather, and food; days 4–6 describe God establishing functionaries to rule over or govern the functions created in days 1–3. Genesis 1 is a temple text, culminating with day 7, and thus the cosmos is a temple in which God "rests" (indwells and rules). Genesis 2 should also be interpreted functionally. The point of the story is not to record the material creation of Adam and Eve, but to depict their function in the cosmos with respect to God, each other, and the world. Thus, the story is archetypal rather than literal—which is not to say nonhistorical (Walton affirms Adam and Eve as historical individuals).

Among the five contributors, Beall is unique in rejecting the significance of the ANE context, excluding modern science from having any bearing on reading the text, and denying figurative features of the narra-

tive. The other four authors hold much in common, but have different perspectives on how to use ANE literature, the relation of Genesis 1:1 to 1:2, the precise meaning and function of *bara'* (create) and *'asah* (make/do), whether to harmonize Genesis 1 and 2 (all agree on the unity of Genesis 1–2), and the significance of a historical Adam to the theological teaching of scripture.

Reading Genesis 1–2 is an excellent book. Each author treats his subject matter with care and detail and the book's general tone is congenial and constructive. My one disappointment was with the final reflection chapter written by Jud Davis, which seems overly dismissive of the significance of current scientific consensus and its relevance for biblical interpretation. It would have been more fitting to conclude a volume of this kind with a summary and constructive analysis of the key issues. That aside, readers of *PSCF* will find the book helpful for clarifying their own understanding of Genesis, as they seek to maintain faithfulness to the Bible *and* integrity in their scientific work.

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THEOLOGY

MODELS OF ATONEMENT: Speaking about Salvation in a Scientific World by George L. Murphy. Minneapolis, MN: Lutheran University Press, 2013. 145 pages. Paperback; $18.00. ISBN: 9781932688856.

George Murphy ought to be no stranger to those who have been working at the theology and science interface for any length of time. With a Johns Hopkins PhD in physics and ordination as a Lutheran pastor, he has authored at least four other books at this crossroad. The present work builds on his *The Cosmos in the Light of the Cross* (T&T Clark, 2003), especially the theology of the cross motif central to the Lutheran theological tradition.

Whereas until relatively recently much of the Christian theological work written in the religion and science arena involved more generically Christian perspectives, more confessional or tradition-specific approaches are appearing, including specifically Orthodox, Wesleyan, and even Pentecostal contributions, to name some. Murphy is one of a few in the Lutheran tradition who has engaged in these matters by drawing deeply from the wellsprings of his own ecclesial resources, especially Martin Luther's theology of the cross theme. If "the cross tests everything," as Luther insisted, then theological reconstruction in a scientifically explicated world also ought to run the gauntlet of this cruciform criterion. Five middle chapters of this volume thus reconsider classical theological loci—including theological anthropology (human nature), the traditional doctrine of the Fall (the present sinful human condition or the creational problem), the drama of redemption (involving the renewal or reorientation of creation from its misdirectedness), the Christ-event (incarnation and passion, especially), and the doctrine of salvation (soteriology, especially justification, regeneration, and sanctification)—all in the light of the cross of Christ. The cross and resurrection thus, for instance, are understood as exerting *fiduciary influence*—not merely moral influence, as one particularly prominent strand of atonement theory avers—even for contemporary human beings, in generating the faithful response required for experiencing divine redemption in a world gone wrong. This is consistent, of course, with the Protestant emphasis on salvation by grace through faith, albeit inflected, in the Lutheran tradition, through emphasis on the centrality of the cross.

Murphy helpfully and clearly indicates that his goal is not specifically a scientific theology, as if traditional formulations would be revised utilizing scientific categories, but a restatement of biblical and historic Christian orthodoxy for twenty-first-century scientifically informed faithful. As such, he works diligently with both biblical and historical material, careful to clarify what carries over and how it carries over in the contemporary context. More precisely, as the title of the book indicates, Murphy is motivated to render coherent Christian understandings of salvation in a time when science has been understood by many to be salvific in its own right. The result is a primarily theological, even soteriological, work, not exactly a work in theology and science.

Yet scientifically literate believers wanting substantive theological reflection will find this book helpful and rewarding. The decision to publish this volume with Lutheran University Press is certainly understandable, although the importance of the cross for Christian faith in general means that the book's treatments of these historic Christian commitments ought to be of concern for those across the evangelical, ecumenical, and catholic (universal, that is) spectrum. As a book of relatively modest size covering as many central Christian doctrines as it does, no doubt some readers will want more extended discussions about this or that topic, even as those more to the "right" or "left" of the "great tradition" of Christian orthodoxy will also be dissatisfied that some moves are too "liberal" or too "conservative." But those desir-

ing some guidance about how to make sense of Christian faith "in a scientific world" will not come away disappointed.

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Letters

A Response to the Review of *Cleansing the Cosmos: A Biblical Model for Conceptualizing and Counteracting Evil*

I would like to thank Gregory Boyd for his review and critique of my book, *Cleansing the Cosmos: A Biblical Model for Conceptualizing and Counteracting Evil* (*PSCF* 66, no. 1 [2014]: 57–9). As I mention in the book, there is much I admire about his work on evil, and indeed our theologies have much in common. However, I do have a few points of clarification. First, with respect to my understanding of warfare models, I claim that warfare imagery only implies or suggests a view of equal and opposite forces (pp. 24, 125, 213), and I am clear that proponents of warfare models do not endorse a metaphysical dualism or believe that "spiritual warfare" occurs between equal forces (p. 24).

Second, with respect to metaphors, I maintain that Boyd's use of the concept of God at War is not well developed, although his response seems to indicate another point of agreement between us. Linguistic treatments of evil are seldom mentioned in works that affirm the reality of the demonic world; this led me to conclude that proponents of "spiritual warfare" models fail to appreciate the metaphorical nature of biblical references. This lack often leads to a focus on only a few biblical texts (Boyd's work being an exception).

Third, ontology is a secondary theme of my work, and although I attempt to use linguistic avenues rather than philosophical ones, I very much agree with Boyd that metaphorical and metaphysical truth can be difficult to extricate and explicate (this is evident in science as well). I suspect his difficulty in getting "clear what these descriptors mean" is a reflection of the very problem I address: the nature of evil spirits is nebulous. This is why I suggest that using multiple metaphors (not limiting ourselves to warfare ones) may enhance our understanding. Interestingly, Boyd's contention that "nothingness" is "a domain of possibilities that becomes actualized only when free agents, human or angelic, choose to do so against God's will" is a point I make several times, albeit with different language (pp. 116–7, 227, 250, 270, 273–6). In fact, I disagree with Barth that evil is not allowed ontological status; I suggest that it becomes real when humans open a doorway to the demonic through sin.

To further clarify, although I suggest that my spatial model has many advantages over a warfare model, I admit that my model could, in fact, incorporate warfare metaphors (pp. 126, 286). Ultimately, my conclusion is more modest: a spatial/boundaries model offers a viable alternative to a "spiritual warfare" one (pp. 126, 213, 285).

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Microscopic and Macroscopic Quantum Realms

The quantum mechanical description of reality and its relevance and implications for the Christian faith plays a central role in the physics theme of the March 2014 issue of *PSCF*. Mann correlates the recent progress in physics with Christian theology by considering typicality, plurality, reduction, quantization, and eternity.[1] Faries emphasizes the challenge of chance and quantum physics to a theological worldview.[2] Carlson and Hine consider the question on how to integrate randomness in the physical world with our theological thinking.[3]

Quantum entanglement lies at the foundation of quantum mechanics. Witness Schrödinger highlighting entanglement with his puzzling cat thought experiment and Einstein deriding it as "spooky action at a distance."[4] Nonetheless, quantum entanglement has been verified experimentally and is essential for quantum information and quantum computing. The quantum superposition principle, together with entanglement, dramatically contrasts the quantum from the classical description of reality. This issue of *PSCF* helps integrate physical reality with a Christian worldview.

The question of the interpretation and the measurement problem in quantum mechanics is important since it clarifies and gives us an insight on how to reconcile physical reality with our Christian faith.5 Van Kampen has written extensively on how quantum mechanics successfully explains macroscopic, objective, recorded phenomena.6 The latter are the experimental data one obtains for microscopic objects