



ENVIRONMENT

CARE OF CREATION: Christian Voices on God, Humanity, and the Environment by Joseph Coleson, ed. Indianapolis, IN: Wesleyan Publishing House, 2010. 203 pages. Paperback; \$14.99. ISBN: 9780898274516.

This is the fifth book in the Wesleyan Theological Perspectives series, all edited by Joseph Coleson, professor of Old Testament at Nazarene Theological Seminary, Kansas City, MO. The eighteen authors, most on the faculties of Wesleyan academic institutions, met to plan their contributions, resulting in a coherent, unified presentation. An introduction by the editor summarizes its structure and the themes to follow.

Part 1, "Creation, Alienation, Redemption," has four chapters, each by a theologian. Referring to Genesis 1 as "a narrative so beautiful it often is called exalted or poetic prose," with "a series of three pairings" (days 1 & 4, 2 & 5, 3 & 6), Coleson himself expounds the biblical account of the creation of humanity and the mandate for care and stewardship. Next, other writers continue with discussions of sin and then redemption. The effects of human sin are characterized as "de-creation," described not only in Genesis but also in the rest of the Pentateuch and in prophetic and apocalyptic scripture passages. The chapter on redemption begins with a warning against the Gnostic idea that the life to come will be only spiritual, without the material basis that Christian belief in the physical resurrection of the body affirms; it continues with citations from the New Testament and from Wesley's writings looking forward to the perfection of the new creation. Part 1 closes with biblical reasons why Christians must care for God's creation, but we can only do this rightly if "we obey his call to separate ourselves absolutely to him."

Part 2, "Care for Humanity," comprises three chapters, the first two coauthored by a theologian and a scientist. Ethical challenges of genetic engineering include genetically modified food, on which "we must move cautiously, seeking to do the least amount of harm while effecting the greatest good," as well as frozen embryos, each of which represents a human life. The chapter "Choices between Life and Death" explains why abortion and euthanasia are wrong, with information on their legal status in the United States and the position of the Wesleyan church, in the light of scriptural teaching on how "each human being, no matter the stage of development, bears God's image" and on reliance on God's strength to endure suffering. Jo Anne Lyon, a general superintendent of the Wesleyan church, contributed the final chapter in Part 2, "Living by the Golden Rule," which focuses on crimes against women and children around the world, especially human trafficking, and "environmental disaster as violence against the poor"; our response must include both prayer and practical action.

Part 3, "Care of the Environment," has four chapters that continue to unite biblical themes and science, by theologian-scientist teams. Contributors include ASA members Richard Daake and Martin LaBar. Conservation of land, water, and natural resources requires an end to waste and respect for God's creation. Animals we raise as pets or for food must have humane treatment, which

modern industrialized agriculture may not provide; eating less meat is a Christian option. The concern God has for every creature motivates Christians to preserve endangered species and habitats; obstacles to this are "the recent rapid increase in human population, giving world-wide impetus to habitat destruction," and also global warming. Part 3 ends with a fifth chapter, "A Call to Action" by Matthew and Nancy Sleeth, founders of the Christian organization Blessed Earth. They describe their conversion experiences and use the parable of the Good Samaritan to encourage Christians to put the ways for conserving water, energy, and materials into practice, using savings to advance God's kingdom.

While not comprehensive, *Care of Creation* contains accurate information on the topics it discusses. Although it avoids any mention of evolution as the process through which life and humanity came into being, it does direct the reader to Francis S. Collins, *The Language of God*: "If you have wondered whether science and Christian faith are compatible, this book is for you." The reference for a definition of "species" is Ernst Mayr, *Populations, Species and Evolution*. Each chapter of *Care of Creation* has "Suggestions for reflection and action," which make it particularly suitable as a resource for study groups; "For further reading" follows, listing several books with a brief comment on each. Wesleyans will especially value the emphasis on John Wesley's writings and sermons, and on the distinctives of the Wesleyan church. ASA members will appreciate this book as a brief account of reasons why Christians should care for humanity and the environment, with the use of scripture in every chapter as a real strength.

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GENERAL SCIENCES

THE FALLACY OF FINE-TUNING: Why the Universe Is Not Designed for Us by Victor J. Stenger. Amherst, NY: Prometheus Books, 2011. 341 pages. Hardcover; \$90.00. ISBN: 9781616144432.

Victor Stenger is an intelligent person, so I am puzzled why he wrote a book with so many logical fallacies. Either he is trying to mislead the reader through dishonesty or else he is badly mistaken himself. Taking his book at face value, he does not even know how to define the fine-tuning of our universe, which is the anthropic principle. The correct brief definition is that many of the universal constants of our universe have just the right values to allow atoms, stars, planets, and eventually life to exist. It does not pertain to the fine-tuning of limited things in our universe, such as our earth, which could also be fine-tuned. It is the fine-tuning of our universe as a whole which points most strongly to the existence of a Creator God. Beginning in the preface, he immediately misleads the reader on this point by talking about the unique events in the lives of his grandparents and parents that led him to be born. By treating this as an analogy to the fine-tuning of the universe, he discounts fine-tuning as evidence for a Creator, attributing it all to chance.

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His worst atrocity is seen in the way in which he discounts the fine-tuning of the fundamental constants of our universe. In section 3.3, titled "Space, Time, and Reality," his first sentence is, "Most people, including most physicists, believe that models and laws of physics directly describe reality." He then goes about discounting this belief. Later in this section, he says, "Now, none of this should be interpreted as meaning that physics is not to be taken seriously. When I say physical models are human inventions, I mean the same as if I were saying that the human camera is a human invention." This is a precursor to his illogical treatment of the fundamental constants of nature, which he prefers to call "parameters." To lead the reader into his argument, he states, "But if they are human inventions then they need special attention of a human to come out 'just right.'"

Next, he explains that the speed of light, c , along with time measurements, is used to define the unit length of a meter. A meter is defined as the distance light travels in $1/299,792,458$ seconds, which fixes c to the value $299,792,458$ m/s. Thereby, he concludes, "The quantity c cannot be fine-tuned. It is fixed by definition." He then discusses Newton's constant, G , and Planck's constant, h , and concludes, "The values of G , like c and h , depends on the system of units being used and likewise is not a universal constant." Here, of course, he is inverting the dependence. It is not the fundamental constants depending upon the units but rather the units depending upon the values of the fundamental constants. Scientists chose this definition of a meter in terms of c because it gives them a more precise unit of length, recognizing that elapsed time can be measured much more accurately than spatial length. Within this section, he makes other misleading statements. The relative strengths of the fundamental forces of nature are fine-tuned, and Stenger points out that they "are not even constant in our universe, but depend on the energies of the particles interacting with one another," thereby discounting their importance. In reality, this energy dependence of the forces would only universally come into play when the universe was a fraction of a second old. The strengths of the fundamental forces are essentially constant during the formation of atoms, stars, planets, and eventually life. Rather than discounting the fine-tuning of these constants, we should actually add additional constants, which may also be fine-tuned, describing the forces during the first second of the universe's history.

Later in the book, there are three primary approaches Stenger takes to try to discount the fine-tuning of the fundamental constants of nature. He argues that it is coarse-tuning, rather than fine-tuning, and that their actual values can be varied by large amounts and still allow an interesting universe. Secondly, he argues that there are many fewer fundamental constants than claimed which significantly affect the properties of the universe. Thirdly, he argues that the fundamental constants are not all independent and that either their relative values can be explained or else the adverse effect of changing one of the parameters can be corrected by adjusting other parameters. He is very wrong on all of these points.

On page 90, Stenger mentions the twenty-six constants of the standard model of elementary particle physics, but fails to acknowledge that there is no theoretical connection

between any of their values, and that, therefore, they must be treated as all being independent. About ten years ago, I heard a particle physicist give a talk at Fermi National Accelerator Laboratory on the fine-tuning of these constants. He marveled at the fact that slight changes in the values of any of them would make our universe uninteresting—without atoms, stars, etc. At no time did he use the term anthropic principle, raise the question of a Creator, or give any indication of what his religious beliefs are.

Let us consider one of the constants, the strength of the strong interaction. Its value could not change by even one percent up or down without having catastrophic consequences for our universe. Because of its fine-tuning, some deuterium, helium, and lithium can form quickly, early in the Big Bang expansion of our universe, leaving mostly hydrogen, which is necessary for stars. The strength of this force helps dictate the fusion rate of hydrogen in making heavier elements in stars, allowing stars to use this process for billions of years before dying. It explains such things as the production and abundance of carbon and oxygen and other essential elements. Stenger talks about deuterium, carbon, and oxygen abundance, but he does not talk coherently about them together. By looking at one specific feature of our universe, Stenger can argue for coarse-tuning or even interdependence of the constants. Looking at one narrow property of our universe, it may be possible to correct for the adverse change in this property, which was caused by a change in one constant, by modifying other constants. Such an attempt will adversely affect other features of the universe, making this type of compensation between constants impossible.¹

In 1951, physicists were puzzled as to why carbon could form in stars, but not in the Big Bang. Fred Hoyle predicted that there must be a resonance in carbon, based upon the strong interaction, to allow carbon to form in stars. Shortly thereafter, the resonance was discovered. Since this is an example of fine-tuning, it is claimed that Hoyle's prediction is a successful prediction of the anthropic principle. Stenger makes a big issue that further study of the strong force could have predicted such a resonance, thereby discounting this so-called "anthropic prediction." Stenger includes a lot of physics theory in his book in a way which clouds the real issues about fine-tuning. He goes off on tangents such as his deity debates with William Lane Craig, discounting the origin of the universe as a "First Cause" or "Something from Nothing." He brings up the issue of multiverse theory. One of my biggest complaints about this book is that the reader will not get a good idea of the claimed breadth and strength of the fine-tuning argument. Although Stenger gives references to many publications describing the anthropic principle, these are not a substitute for his deficient description.

Note

¹Wheaton College's physics department has introduced several weeks of quantum mechanics in its first-year physics course for majors. The last lab in this course is a study of the fine-tuning of the strong force. The lab approximates the strong force in nuclei by a square well potential and studies much of the fine-tuning of this force on the properties of our universe. Contact the physics department to get a copy of this lab.

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WHY GEOLOGY MATTERS: Decoding the Past, Anticipating the Future by Doug Macdougall. Berkeley, CA: University of California Press, 2011. xv + 285 pages. Hard-cover; \$29.95. ISBN: 9780520266421.

Every budding geology student early learns the maxim that the present is the key to the past. Doug Macdougall, professor emeritus of earth sciences at Scripps Institution of Oceanography, would certainly concur with that adage. He has written *Why Geology Matters* in part because of a "desire to share some of the excitement about what geoscientists have learned about our amazing planet in recent decades" (p. xiv); much of what we have learned does indeed concern the geologic past. The primary thrust of Macdougall's book, however, is that *the geologic past is also a key to the geologic future*. As he sees things, the Earth sciences hold "the keys to understanding and addressing many of the most pressing problems facing society" (p. 250).

Macdougall exudes great enthusiasm about what geoscientists have learned in a dozen lucid, vivid, informative summaries of significant episodes of Earth history and of some major geological phenomena. His synopses, introduced by a survey of the development of methods for deciphering Earth's past, include discussions on the origin of Earth, impact events, Earth's first two billion years, plate tectonics, earthquakes, construction of supercontinents, glaciation and ice ages, the Paleocene-Eocene Thermal Maximum, large igneous provinces, extreme volcanic eruptions, and mass extinctions. The sketches serve as gateways to consideration of some major contemporary societal concerns. What is the likelihood of sizeable extraterrestrial objects colliding with Earth? Is global climate warming, cooling, or fundamentally stable? What are the risks of global warming? How serious is oceanic and atmospheric acidification and how does it impact life forms? What is the status of earthquake prediction? Must we be fearful of a cataclysmic volcanic eruption in Yellowstone? And how widespread will biotic extinctions become? Macdougall concludes with an assessment of the future in relation to water, energy, and mineral resources as well as global climate change.

To give the reader just a taste, I offer summaries of two chapters. In chapter 3 "Close Encounters," Macdougall weaves a compelling narrative around Arizona's Meteor (Barringer) Crater, the 1908 Tunguska explosion over Siberia, and especially the great impact event believed to have triggered the demise of the last dinosaurs as well as hundreds of other organisms that brought the Cretaceous Period to a close. In piecing together a picture of past impact events, geoscientists have incorporated a host of data and theory drawn from diverse fields. From geology Macdougall brings in impact ejecta blankets, shatter cones, shock-induced high-pressure minerals, fossil meteorites in Sweden, and the "smoking gun" of the end-Cretaceous impact, Chicxulub crater, now buried beneath sediments of the Yucatan Peninsula of Mexico. Terrestrial impact sites are linked to their sources in the asteroid belt by comparison of distinctive chemical signatures at those sites with chemical compositions of specific asteroid families. Physics enters by way of shock-induced phenomena at impact sites, and solar system astronomy makes its contribution through computer simulations of asteroid collision histories and calculation of subsequent trajectory

ries of collision fragments. Large impact events exerted profound effects on the biosphere through disruption of the food chain, resulting in extinctions. Paleoceanography considers cooling effects in the atmosphere resulting from impact-generated dust and subsequent atmospheric heating effects created by large inputs of greenhouse gases from impact melting of limestone and smoke produced by incinerated vegetation. After painting a rather frightening picture of what may plausibly have happened during and after the end-Cretaceous impact, Macdougall poses the question of the likelihood of future collisions of large bodies with Earth in the light of our current knowledge of positions and paths of extraterrestrial objects and of the current frequency of entry of objects of various sizes.

Chapter 8 "Cold Times" summarizes our knowledge about the Pleistocene Ice Age in the light of the following: geochemical and sedimentological clues in deep-sea sediments; plate-tectonic driven reconfiguration of continents and associated oceanic circulation patterns; alteration of precipitation patterns and albedo; distribution of glacial deposits; the periodicities of precession of the equinoxes, obliquity of Earth's rotational axis, and eccentricity of Earth's orbit; changes in solar insolation; variation in seawater paleo-temperatures determined from oxygen isotope ratios of fossil shells and glacial ice; and concentrations of atmospheric greenhouse gases preserved in ice-trapped bubbles. Macdougall points out that we can now more effectively assess how the climate system might respond to future perturbations based on insights into its operation during the Pleistocene Ice Age.

Both chapters, as do the others, illustrate the interdisciplinary nature of the Earth sciences. Indeed, Macdougall is convinced that a "holistic [my emphasis] view of our planet is important for fully understanding the workings of the Earth today, for deciding its history, and also for using that knowledge to predict the future" (p. 250). As every geologist knows, geology "is perhaps the most truly interdisciplinary of all the sciences" (p. 249). Indeed, the broadly interdisciplinary character inherent to the geosciences is a major source of the appeal that geology/Earth science has for its practitioners. If anything, the interdisciplinary character of geology needs even greater emphasis for future students.

Macdougall's book amounts to an implicit (and occasionally explicit, see p. xiii) wake-up call for a much larger place for geoscience education. After reading his book, I was confirmed in my unflinching bias that policy makers, politicians, the general public, and, yes, scientists all need far more exposure to the Earth sciences if we are to address and mitigate successfully the global resource, natural hazard, ecological, and climate change issues that confront us.

As a Christian, I make bold to apply Macdougall's concerns more specifically to the Christian community by insisting that all Christian high school and Christian college students need to acquire substantial knowledge about the structure, composition, behavior, and history of their God-given home, planet Earth. The current situation, in which the geosciences are totally ignored, or woefully underemphasized, or grossly distorted in Christian high schools and Christian liberal arts colleges, is inexcusable and must radically improve. *Why Geology Matters* should

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be mandatory reading for all scientists, politicians, pastors, theologians, school board members, and academic administrators, especially those in Christian educational institutions.

Reviewed by Davis A. Young, Tucson, AZ 85737.



HEALTH & MEDICINE

HUMANITY'S END: Why We Should Reject Radical Enhancement by Nicholas Agar. Cambridge, MA: The MIT Press, 2010. 215 pages. Hardcover; \$32.00. ISBN: 978-0262014625.

Nicholas Agar advocates some enhancements to human beings toward peak levels that already exist among us. That is clear in his 2004 book, *Liberal Eugenics: In Defence of Human Enhancement*. However, he is against radical enhancement of athletic prowess beyond our current top sprinters, of intellect beyond Einstein, and length of life beyond the current record of 122 years. He sees changes of such magnitude producing eventually a new species that would leave behind much that is good about human existence. Agar unfolds his argument in engagement with four transhumanists who cheerfully call for the radical enhancement he rejects.

The first is Ray Kurzweil who looks forward to the law of accelerating returns, eventually triggering a surge in superintelligence and semi-immortality. In reply, Agar is concerned that such artificial intelligence will lose characteristics and moral commitments that are unique to *human* intelligence. Indeed, radically enhanced intelligence may become smart enough to work around any safeguards that humans program in, such as not to harm humans.

The second proponent addressed is gerontologist Aubrey de Grey. He hopes to extend the human life span. Agar thinks that success in that endeavor would shift our values harmfully toward being even more self-centered and limit our experiences to those safe enough for human beings expecting extremely long lives. There would be so much more to lose if life spans were indefinite.

The work of the philosopher Nick Bostrom is the third focus. Agar says that Bostrom is so focused on the advantages of proposed changes that he does not take into account their attendant harms.

The fourth transhumanist is the sociologist James Hughes. Hughes projects that superior beings would affirm "democratic transhumanism" that would protect all persons from exploitation whether they are human, transhuman, or other. Agar replies that if a new species is established and practices the social contract or consequentialist moralities that dominate society today, then that new species would likely persecute or even enslave those left of the human species. He sees how human beings currently treat the apes as a cautionary example. Therefore, it is in our interest as human beings to make sure that no such new species arises.

Critiquing Agar's critique, much of his concern keeps coming back to species differentiation. That is a distant

threat. It is the nature of genetics to disperse and recombine traits. What is advantageous spreads throughout a population. Human beings separating into exclusive species is an unlikely occurrence unless whole populations are isolated from each other, say on different planets, or centers of consciousness are transferred to nonbiological systems that bypass the interrelatedness characteristic of genetics. Such contexts are conceivable, but far from present challenges.

If major differences somehow do start to develop, the response of limiting the abilities of others as a kind of self-defense is a devastating strategy. Would we really want a society where no one could be more healthy, athletic, thoughtful, self-disciplined, or have any other skill or attribute superior to others, lest that skill be turned against another?

Further, cumulative changes in our species would not necessarily make us less human than humanity is intended to be. Human beings have changed dramatically in even the last few thousand years. Are those of us growing taller or living longer less human? Whether looking at an evolutionary time scale or only recorded human history, it is characteristic of humans to change. That is not foreign to the Christian tradition. For example, 1 Corinthians 15 promises that there is dramatic change ahead for the members of God's kingdom. God's plan for his people is that they will someday continue in a new form. The perishable will not inherit the imperishable, for we shall all be changed. As well, the resurrection of Jesus as the first-born of the new creation into a strikingly new and capable body is not described as a travesty of the created order, but rather as its fulfillment. Substantial change of itself does not necessarily move us away from being human.

Humanity's End is thorough and precise for the philosophically inclined, yet well illustrated and accessible to any college-educated reader. I recommend it as a thoughtful contribution to a formative discussion.

Reviewed by James C. Peterson, Schumann Professor of Christian Ethics and Director of the Center for Religion and Society, Roanoke College, Salem, VA 24153.

SPIRITUAL HEALING: Scientific and Religious Perspectives by Fraser Watts, ed. New York: Cambridge University Press, 2011. 207 pages. Hardcover; \$87.75. ISBN: 9780521197939.

This book is a collection of essays from theologians, anthropologists, and psychologists regarding the topic of spiritual healing. Sick patients will be influenced by various aspects during their medical care—physicians, nurses, medical technology, and pharmaceuticals. A patient's spiritual insight may play a role in influencing the healing process, and the authors of the various essays in this book attempt to address this important aspect.

It should be noted that this book is not objective on spiritual healing, but instead it provides an overview from writers who find this feature of health practice potentially beneficial. The first chapter provides an overview of spiritual healing. At the onset of this book, this particular

author states that "science is gradually becoming increasingly emancipated in its ontology and the range of processes it is prepared to accept ... there will be less and less reason for regarding exceptional phenomena as outside the laws of nature." In other words, the author claims that spiritual healing should be considered a scientific process that has a spiritual basis. I find it difficult to believe that most US medical schools would follow this claim.

Chapter 2 deals with the healing miracles of Jesus, and it is quite well written and helpful. The author explores the various ways critics have tried to explain away healings performed by Jesus (psychosomatic, psychological, etc.). This chapter provides wonderful apologetics material for a Christian.

Chapter 3 evaluates the way the church has regarded spiritual healing in its development through the centuries, while chapter 4 discusses mystical Judaism and its influence on spiritual healing in that specific religious community. Again, these two chapters are very well done and helpful for those needing further insight into spirituality and healing in Christianity and Judaism.

After these chapters, the book goes into great detail about various aspects of spiritual healing. Chapter 5 compares Christian versus secular spiritual healing. This chapter is fascinating in that it explains how some proponents of spiritual healing would divide their belief system into "Type 1" (described as intense caring about the subject) and "Type 2" (described as using a healing energy). Chapters 6 and 7 evaluate the psychodynamics and biopsychosocial aspects of spiritual healing. The authors argue that illness allows us to know ourselves better and to reconnect with our self-healing processes. It is true that having a chronic disease can make someone be introspective; however, the book uses phrases such as "strengthening the immune system" and "detoxify" as a side effect of spiritual healing without giving a scientific explanation.

The remainder of the book (three chapters) looks at spirituality and its effect on disease. Here is where the book becomes much more biased. One author claims that US physicians are using spiritual healing and prayer commonly as a standard of care by citing a study in which 13% of California physicians use prayer or religious healing (while not commenting that 87% do not!). This same author reports on the positive effect of distant healing intention (DHI), which is characterized as the mediation by a practitioner on another person's disease using meditation at a distance. Although studies have been done that suggest that DHI may enhance healing, these studies do not address confounding variables between patient groups (for example, smoking, alcohol use, family history of disease). Systematic reviews of DHI have been difficult to perform due to poor methodology in many of these studies.¹ None of these negative aspects are discussed in the book. Additionally, the authors state that spiritual healing works, based on "anecdotal reports of spiritual healing that can be found in many traditions." Although it may be subjectively true that we have all heard stories of people who have been healed through the power of prayer, such anecdotal reports fall well below established quality of evidence as outlined by the US Preventive Services Task Force.

In the end, this book's overall theme is that spiritual healing works and should be utilized in the armamentarium of the health-care provider. It may indeed work; however, the book does not provide adequate evidence for its use. There is a national debate as to whether this type of care, including all aspects of complementary-alternative medicine (CAM), can be or should be studied. Indeed, concern has been expressed as to whether federal funding should be provided for any type of CAM research, as the quality of research can be quite poor.² Finally, CAM, including spiritual healing practitioners, may be participating in nothing more than a useful placebo effect.³

This book is helpful if a reader is looking for an explanation and overview from those who believe in spiritual healing effectiveness as an adjunct in medical care. Again, some of the chapters (such as the chapter discussing healings by Jesus) are quite good. However, there is no real discussion about the lack of good medical studies regarding this type of CAM. In this aspect, the book is subjective, not objective, and provides only a limited and one-sided exposure of this subject.

Notes

¹J. Astin, E. Harkness, and E. Ernst, "The Efficacy of 'Distant Healing': A Systematic Review of Randomized Trials," *Annals of Internal Medicine* 132 (2000): 903–10.

²D. Brown, "Critics Object to 'Pseudoscience' Center," *The Washington Post*, March 17, 2009 (www.washingtonpost.com/wp-dyn/content/article/2009/03/16/AR2009031602139.html).

³"Think Yourself Better: Alternative Medical Treatments Rarely Work. But the Placebo Effect They Induce Sometimes Does," *The Economist*, May 19, 2011 (www.economist.com/node/18710090).

Reviewed by John F. Pohl, Associate Professor of Pediatrics, Department of Pediatric Gastroenterology, Primary Children's Medical Center, University of Utah, Salt Lake City, UT 84113-1103.



HISTORY OF SCIENCE

QUANTUM LEAP: How John Polkinghorne Found God in Science and Religion by Dean Nelson and Karl Giberson. Oxford, UK: Lion Monarch, 2011. 192 pages. Paperback; \$14.99. ISBN: 9780745954011.

Readers of this journal will need no introduction to John Polkinghorne. He is the author of over thirty books on science and faith, including an autobiography; so it was with some surprise that I discovered this new biography. This, however, is no traditional biography. Nelson and Giberson attempt to "tell the story of Polkinghorne, and along the way ... unfold some bigger issues" (p. 7).

We are presented with the life of Polkinghorne, from his birth in 1930, the death of his brother during World War II, his education at Trinity College, Cambridge, his career in particle physics, through the ordination process in the Anglican Church, to parish life in Kent, and back to academia in Cambridge. In between this, we are introduced to many of the key ideas of Polkinghorne. These include the relationship of science and faith, the nature of reality, the resurrection of Jesus, the role of prayer,

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miracles, the problem of suffering and pain, and life after death.

As I read, I kept getting a sense of *déjà vu*. There is little or no new material here, but what we have is a well-constructed summary of Polkinghorne's books interspersed with biographical details. Interviews have been conducted with Polkinghorne of which we have a few extracts, but the majority is material gleaned and edited from Polkinghorne's writings. This is a strength of the book; it provides a good introduction to Polkinghorne. It is also its weakness as it provides no new information or insight.

Unfortunately, there is a tendency toward the hagiographic—very little or no criticism of Polkinghorne is presented. This is a shame as some of Polkinghorne's views will be controversial to many Christians, particularly his view of post-mortem salvation. The strength of this approach is that the authors let Polkinghorne "speak" for himself; the weakness is that we are left wondering what Nelson and Giberson's views are.

At times, what is presented here is a rationalistic, almost evidentialistic, view of Polkinghorne. This is even suggested by the book's subtitle, "How John Polkinghorne Found God in Science and Religion." It seems to imply that we find God, rather than that he finds us: "it's the evidence that leads a physicist to believe in the equations, and it's the evidence that leads a person of faith to believe in God" (p. 183).

This well-written book will provide an *amuse-bouche* or a taster into the life and work of Polkinghorne. It is strong on description but weak on evaluation. The book is not aimed at readers of this journal who have thought through issues of the integration of science and faith; rather, it is aimed at those who think that being a Christian and a scientist involves "intellectual suicide," or is as logical as being a "vegetarian butcher" to use Polkinghorne's phrase. There are five pages of endnotes, but no index and no list of Polkinghorne's books.

For those who want to know more about Polkinghorne's life, I suggest obtaining a copy of his autobiography *From Physicist to Priest*. For more on his view of the interaction of science and faith, a good first place is his *Quarks, Chaos and Christianity* and then his *Reason and Reality*.

Reviewed by Steve Bishop, City of Bristol College, Bristol, BS16 4RL, UK.



MATHEMATICS THROUGH THE EYES OF FAITH by James Bradley and Russell Howell. New York: HarperOne, 2011. viii + 288 pages, with index. Paperback; \$19.99. ISBN: 9780062024473.

Do mathematical concepts point beyond themselves to a higher reality? Can the idea of chance be reconciled with God's sovereignty? How do we account for mathematics being so effective in describing the world? How does giving people the capacity to do mathematics fit into God's purposes for humanity?

These are just a few of the questions tackled by the latest installment in the series *Through the Eyes of Faith*. This is the second collaborative work produced by the Association of Christians in the Mathematical Sciences. The first work, *Mathematics in a Postmodern Age: A Christian Perspective* (Eerdmans, 2001), is primarily a collection of scholarly articles, some of which require prior knowledge in higher mathematics or philosophy for full understanding. This recent project was undertaken with the goal of making the relationship between mathematics and Christian belief a more accessible topic. The authors have thoroughly succeeded in this task.

Chapter one is presented as hypothetical dialogue between four students in an introductory math class at a Christian college, each with varying degrees of mathematical ability and interest. Their conversation centers around the seemingly innocuous (to some) question: Could God have made a world in which $2 + 2 \neq 4$? The conversation begins at a basic level that one might expect for people with no experience in studying the relationship between mathematics and Christian faith. But then the conversation builds, through the art of skillful questioning, toward considering some of the deep and complex issues that are present in this relationship, several of which are stated above. The conversation also serves as a microcosm for the methodology of the book as a whole: pushing its audience beyond surface level questions to deep and meaningful contemplations.

Chapter two provides a brief historical context for thinking about these questions. The authors trace the relationship between mathematics and belief (be it purely philosophical or explicitly theological) from ancient Greece to modern times. Here the authors demonstrate that mathematics and faith have long been associated, as our mathematical knowledge influences our response to life's purpose in several respects: how we see our place in the universe, how we organize our understanding, and how we live our daily lives. Not until the Enlightenment did the theological significance of mathematics come to be largely ignored. But for us today, from a distinctly Christian perspective, "We have been given the opportunity to investigate God's good creation, and this understanding motivates our study of mathematics, which has at least a two-pronged purpose: to enable us to be more effective stewards of creation, and to give glory to God" (p. 240).

The rest of the book addresses various themes in mathematics and how they relate to Christian belief. These include specific mathematical topics (infinity, dimension, chance), broad mathematical characteristics (proof, beauty, effectiveness), and philosophical issues (epistemology, ontology). The book closes with an apology (in the classical sense) for mathematics as a meaningful Christian vocation.

Each chapter contains sidebars describing historical figures and noteworthy events. This helps put a face on a topic that can tend toward the abstract. Scriptural references are used often, but appropriately. The authors do not overstep their bounds by stretching the meaning of a passage too far to accommodate their topic. Each chapter closes with suggestions for further reading on the particular topic as well as numbered exercises, making

this book immensely practical for a mathematics course at the undergraduate level (or simply as a stimulating activity for the casual reader). The exercises range from mathematical proofs to personal and philosophical reflections. This blend of activities serves to further emphasize the authors' message that mathematics need not be so far removed from personal application and theological convictions.

Stemming from the first piece of quoted scripture, Colossians 1:16–17, and the influence of Augustine, a running theme throughout the book is that we do not rightly understand anything until we understand its connection with Jesus Christ. “How we know something in mathematics is similar to investigating the grounds of any belief system. Were they to linger on this topic, the Christian students would realize that the philosophy of mathematics and Christian faith share a number of interesting touch points. Indeed all things exist and have their being through Christ, including mathematical objects” (p. 217).

Above, I stated that the authors have succeeded in making the relationship between mathematics and Christian belief a more accessible topic. Their success lies not in providing answers to all the questions of this complex topic, but in posing thought-provoking questions and constructing a framework of orthodox Christian belief in which the reader can pursue their own answers, or simply linger on a topic.

I strongly encourage any teacher of mathematics at a Christian institution to find creative ways to integrate this book into their curriculum; at the very least it should be required reading.

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ORIGINS & COSMOLOGY

A REASONABLE GOD: Ordinary Action in a Supernatural World by Arnie Berg. HYTEC Press (<http://www.hYTECpress.com>), 2011. 238 pages, index. Paperback; \$22.96. Kindle; \$9.99. ISBN: 9780986801006.

A Reasonable God is an examination of intelligent design (ID). The author's stated purpose is "... to examine the scientific enterprise as it is related to a Christian worldview." Berg finds ID to be deficient both scientifically and theologically, but considers the evidence for biological diversity through natural evolutionary processes convincing. He concludes that a Christian worldview can allow for the creation of the diversity of life through ordinary natural processes while still acknowledging a supernatural purpose.

Berg, a computer scientist and consultant, begins with an introduction to the nature and practice of science, current theories of cosmology and biological diversity, and brief historical surveys of young-earth creationism and the more recent ID movement. He presents propositions advanced by ID proponents followed by critical responses from both nontheistic and theistic dissenters. A section on

evidence for common descent as the explanation for the currently observed biodiversity is given as an alternative to the propositions of ID. A brief assessment of the surveyed material then leads to the author's aforementioned conclusions.

Berg defines ID as "a belief system that reacts against an increasingly secular worldview that posits ultimate natural causation for all events." He maintains the ID movement is an attempt to defend theism by questioning the scientific adequacy of the neo-Darwinian model of biological evolution. ID proponents consider the Darwinian model to be a result of, and a path toward, "naturalism" and "scientific materialism," which are perceived as threats to theism. Berg initially offers support for his description of ID by surveying themes associated with the Discovery Institute and the film *Expelled* by Ben Stein. He continues with a review of well-known ID authors such as Phillip Johnson, William Dembski, Michael Behe, and Stephen Meyer. Some of the recent court cases involving the teaching of ID in public schools are also briefly addressed.

Berg continues his discussion of ID by examining critical responses by nontheists, such as Michael Ruse and Mark Perakh, and a number of theists. Scientific concepts such as "irreducible complexity" and the inclusion of supernatural causation within natural science are criticized. The question of "bad" or "nonoptimal" design is also proposed by critics as a means of falsifying the testable portions of ID theory. Theists echo the scientific critique of the nontheists and offer additional reflection on the theological implications of ID. Some of the theists considered are Alister McGrath, John Polkinghorne, Denis Lamoureux, John Walton, John Haught, Francis Collins, and Nancey Murphy. The theological concerns expressed about ID range from comparisons with young-earth creationism to a god-of-the-gaps approach. The implications of ID for thinking of God as an illusionist and as a source of natural evil involving illness, disease, and repulsive natural behaviors within the animal world are also addressed. Berg concludes this section by stating: "... Intelligent Design is now a fringe activity with little credibility in the mainstream scientific community."

After having offered a negative critique of ID, Berg proceeds to provide supportive arguments for neo-Darwinian evolution. In this section, which addresses biodiversity and common ancestry, Berg surveys many areas of study: morphology, paleontology, biogeography, embryology, genetics, and sub-optimal design. He provides an introduction to each field of study, and then he discusses how common descent offers a better explanation than common design.

The book specifically focuses on the origin of species and limits discussion to a comparison of common design, as proposed by the ID model, with common descent, as proposed by the neo-Darwinian model. To survey this topic within a few hundred pages is indeed challenging. The result is a book which reads with the dry tone of a master's thesis. Despite this tone, the book does make progress in reaching its stated objective.

The book is recommended for anyone interested in comparing the models of ID and Darwinian evolution.

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The reading level is that of post-secondary undergraduate and graduate students engaged in science studies at colleges and universities. Well-read science professors, philosophers, and theologians will also find new material in this book to catalyze their thoughtful engagement with evolutionary science.

Reviewed by Gary De Boer, Professor of Chemistry, LeTourneau University, Longview, TX 75607-7001.

CREATION AND EVOLUTION by Lenn E. Goodman. New York: Routledge, 2010. 222 pages. Paperback; \$39.95. ISBN: 9780415913812.

In his brilliant work, *Creation and Evolution*, Lenn E. Goodman, professor of philosophy at Vanderbilt University, presents a sustained argument for theistic evolution. By "evolution" he means, as Darwin meant, the development of life through small, gradual changes from inert matter to a cell that reproduces itself, to life in its manifold species. By "theistic" he means that the transcendent God of Genesis worked *through* nature, not *upon* nature, to energize the process. Goodman's aim is irenic: to show that evolution and religion are complementary.

Goodman develops his argument through five chapters. In chapter 1, "Backgrounds," Goodman traces the historic clash between evolution and religion. Here and throughout the book, Goodman converses easily with ancient Greek philosophers, Jewish thinkers, and Muslim and Western philosophers. On the one hand, he faults theologians such as Charles Hodge for equating evolution with atheism, and polemicists such as Henry Morris and William Dembski for appealing to probability, "finding the odds just too high for life to have emerged by chance." On the other hand, he faults Daniel Dennett, Richard Dawkins, and others "who idealize a world without God, where only mechanism is an explanation, and natural science is the sole source of value" (p. 35). Goodman argues in contrast that humans seek an ultimate cause and that such a quest leads to a transcendent Author. But he cautions, "We defeat our purpose if we make the ultimate just another object to explain" (p. 38). For Goodman, dynamic nature is the epiphany of God.

Goodman fails, however, to make a convincing case against Morris and Dembski. He accuses Morris of dressing the argument "in flashy scientific colors," but this *ad hominem* does not address the substance of Morris's argument that the DNA code for one enzyme would need some 1,000 nucleotides of four bases each, yielding 10^{600} possible combinations, an "impossible" probability. Moreover, Dembski's argument, that complexity and specification (i.e., yielding a match to a known reality) point to intelligent design, is not refuted by saying that the Krebs cycle "*probably* (italics mine) arose from existing constituents." Goodman notes that "John Sutherland, Matthew Powner, and Beatrice Gerland of the University of Manchester have succeeded in provoking the spontaneous compounding of ribose, base, and phosphate molecules, yielding the nucleotide ribocytidine phosphate" (p. 32). But the devil is in the detail: they "provoked" it—that is to say, intelligent design was involved in the experiment. I wish *Signature in the Cell* by Stephen C.

Meyer (2009), director of the Discovery Institute, had been published earlier so that Goodman could interact with Meyer's sustained argument for intelligent design. In any case, Goodman is convinced that "Darwinism in biology and creation in religious thought are here to stay" (p. 41).

In chapter 2, "Leaving Eden," he maximizes from ancient Jewish sources the opportunity to read Genesis in a way compatible with the book's thesis. In his reading, Genesis does not record "mere incidents" (p. 38). He cites with approval Leon Kass:

Like every truly great story, it seeks to show us not what happened (once) but what always happens ... its truth may lie not so much in its historical, or even philosophical veracity as in its effects on the soul of the reader. [Accordingly,] Adam is the type and figure of humanity. (p. 59)

There is truth and spiritual profit in such a reading, but again the devil is in the details: "mere" and "not so much." To be sure, for Goodman the creation story is not literary fiction, but he mostly neglects the historical facticity of Genesis.

This second chapter is the book's weakest. Jewish Midrash and ancient rabbinic comments are sometimes brilliantly insightful, but at other times they play with scripture, not engaging in the scholarly consensus that good exegesis is founded on the grammatico-historical method (i.e., determining philological issues in their historical context). Goodman handles the text similarly to rabbinic too-sharp exegesis. For example, commenting on "He [God] ceased [from his creative work] and was refreshed [Hebrew *va-yinaffash*]" (Exod. 31:17), Goodman asks, "How is that if God neither sleeps nor slumbers?" He answers, "Homilists, taking *va-yinaffash* transitively, as the causative form seems to invite, find a hint of God's breathing life and spirit into Adam's form" (p. 53). But as first-year Hebrew students learn, the form in question (*Niphal*) is a simple passive, not causative. In an otherwise excellent commentary on the Cain and Abel story, Goodman comments, "The figures are archetypal: a killer ducks responsibility. His victim need not be pure, regal or heroic. Even a simple shepherd's blood cries out to God ..." But he then mars his work: "Thus the Mishnah, noting the poetic plural: 'It is written *the bloods of thy brother cry out* ...' to teach us that whoever causes the death of a single soul is seen biblically as if he'd caused a world to perish." But grammarians classify the plural of "blood" as a plural of composition—like "spilled wheat" and "neck," both plural in Hebrew—denoting "bloodshed." In truth, this reviewer never heard of a "poetic plural." In any case, "bloods" (i.e., "bloodshed") is not a countable plural. A final example of an exegetical blunder: following Genesis Rabbah (23.5), Goodman glosses Gen. 4:25 by "Adam knew his wife more [Hebrew *'od*], taking *more* to mean more deeply." But '*od* expresses continuance (= yet, still), or addition by repetition (= still, yet, more), or a continuance limited by its nature to a single occurrence ("again," as in Gen. 4:25); it does not express a comparative sense of "more" with reference to quality.

On the one hand, readers should not take Goodman's Hebrew philology seriously, in spite of its antiquity and rabbinic pedigree, unless he cites Sarna. On the other hand, although he overly dichotomizes a literal from

a symbolic reading of Genesis 1–9, in teaching Genesis, I will appeal again and again to his perspicacious insights.

"The case for evolution," chapter 3, essentially follows Darwin's original case in his classic, *The Origin of Species*, noting "morphology and taxonomy," "development and rudiments," "fossils and extinction," and "migration and adaptation." Goodman then addresses three questions that Darwin answered ("intricate organs," "elaborate instincts," and "sterile castes and crosses") and one that he could not (Kelvin's challenge, who formulated the Second Law of Thermodynamics). Later science met that challenge. The chapter concludes with neo-Darwinism, citing "Mendel's work," "adaptation observed," "Kettlewell's moths," "drosophila evolving," and the "DNA evidence."

In "Three lines of critique," chapter 4, Goodman addresses Darwin's insistence on gradualism: "My theory would absolutely break down," Darwin says, "if it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications." The intelligent design movement takes up that challenge by the evidence of irreducible complexity as, for example, in the DNA molecule; "organic systems bespeak a prior plan." The argument of design, as Goodman notes, is as old as the Stoics and Aristotle. The Darwinist answers that existing organs take on new uses: "wings serve as fins and forelegs to the penguin, as sails to the ostrich, as flappers to the logger-head duck" (p. 121). But it is a big jump from this gradualism in gross anatomy to molecules that contain systems within systems, presupposing a living organism. The reality of irreducible complexity throws a monkey wrench into Darwin's gradualism. Goodman, citing Massimo Pigliucci, explains, however, that redundancy, a common feature of living organism, frees "one copy of the gene from immediate constraints and can slowly diverge in structure from the original, eventually taking over new functions." Also, Goodman, as do scientists in BioLogos – whom he curiously does not reference – fears that the argument that irreducible complexity points to a higher wisdom is guilty of *reduction ad ignorantiam* (a "god-of-the-gaps" explanation). Meyer, however, explores every known explanation of origins of life by random chance and finds none satisfactory. Meyer argues that this is not an argument from ignorance but from knowledge gained by Darwinian science.

Goodman draws the fourth chapter to a conclusion with "Beyond a God of the gaps." The power of questions about nature, he asserts, lies not in finding the answers to how they work but in the mystery, wonder, and religious awe they invite, a way to react to the presence of God. They point to a reality beyond themselves.

In the final chapter, "That has its seeds within it," he argues that science points to values. There is a teleology in natural history as organisms ever strive for what is their good. Citing Darwin, he explains that no account of species change would be adequate without explaining "how the innumerable species ... have been modified, so as to acquire that perfection of structure and co-adaptation which most justly excites our admiration." Moreover, he argues that "evolution charts the emergence of new values in the rise of higher organisms ... like autonomy, sensibility, and community" (p. 141). "Human beings," he notes,

"distinctively, choose aims expected to give meaning to their lives ... Our ends are never the mere dictates of our genes. We are always, in some measure, who we make ourselves, reaching for a good defined in part by our own efforts" (p. 155). These few citations fall far short of the profundity of this chapter.

Fortunately, Goodman grounds his theology in Genesis; otherwise, he implies a progressive theism, a God who himself is emerging into an open future. Hopefully, his work will move readers beyond theism, beyond the God of the philosophers, to the God of salvation history, the God of Abraham, Isaac, and Jacob, who on a developing historical trajectory fully manifested himself in Jesus Christ and lives a life of seeking the good of others, not self, in his church.

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PALEONTOLOGY: A Brief History of Life by Ian Tattersall. West Conshohocken, PA: Templeton Press, 2010. 240 pages. Paperback; \$19.95. ISBN: 9781599473420.

Ian Tattersall's book, *Paleontology: A Brief History of Life* is a panoramic overview of life's history from the earliest conditions of Earth's formation to the appearance of *Homo sapiens*. It is an introductory text, and Tattersall's approachable, inviting prose makes this book a pleasure to read. The author does not begin his history, proper, until the fourth chapter. The first three chapters are devoted to setting up a framework for understanding and appreciating the significance of the history he later presents.

The author informs us, in the first chapter, of the three different types of rocks of concern to paleontologists and the processes of burial and fossil formation. The geologic time scale is considered and the various clues that fossils can furnish. The second chapter gives us a historical synopsis of the theory of natural selection, including a discussion of the fact and significance of mass extinctions in the history of life. Chapter three is devoted to Darwin's concept of "descent with modification," which the author ably explains employing the notion of "the tree of life." Here, he shows us what it means to claim that all living things are related by common descent.

Having established a framework, Tattersall spends chapters four through eight furnishing a general account of the history of life, from the Precambrian, through the Paleozoic to the "Age of Dinosaurs," the "Age of Mammals" right up to primates and humans. Though each section of the history is quite brief, some evolutionary episodes merit more attention, e.g., the transition from sarcopterygian fish to tetrapods; the appearance of birds from theropod dinosaurs; the origins of the three-boned, mammalian ear and the emergence of whales from terrestrial, "superficially wolf-like hoofed predators" (p. 136).

The author travels at quite a gallop and though it did leave this reader a bit breathless, Tattersall refrains from going into mind-numbing detail. Instead, his narrative so nicely mixes general history with engaging particulars that one willingly rides along.

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The most interesting chapters are chapters nine and ten, the discussion of human evolution. This is not unexpected given Tattersall's eminent standing among anthropologists today. First, the author considers several possible candidates for the designation of "earliest hominid," but he confesses that the evidence is puzzling and inconclusive. Next, in considering Australopiths, he claims that these "bipedal apes" adapted both to open savannahs and arboreal habitats. Why, exactly, bipedality developed remains a contentious issue, and the author frankly admits that the sort of "pelvic adaptations" the earliest hominids had in order to accommodate bipedality remains a mystery. "Lucy," says Tattersall, is a late case, and she already possessed a pelvis and legs that were "radically altered from the ancestral condition" (p. 158). He ends this part of the discussion of Australopiths by saying, "There is still a lot to learn" (p. 158).

Throughout his book, Tattersall exercises the Socratic virtue of intellectual humility, a position I greatly admire. He often acknowledges the ambiguity of the evidence. While some, especially those unsympathetic to evolution, may view this as a weakness, it is, in fact, a great strength. Such a stance enables Tattersall to consider a panoply of alternative explanations for any body of evidence without a trace of defensiveness about what he does not know.

The author emphasizes the way in which morphological changes in the human frame and brain do not necessarily coincide with technological innovations. "From the very beginning ...," Tattersall says, these two things were "out of phase" (p. 167). A case in point is "Turkana Boy" (*Homo erectus/Homo ergaster*, about 1.6 mya) who is, clearly, a striding, obligate biped with a skull structure that anticipates many later hominid developments. He is, as Tattersall puts it, "... a total break with the past. Nothing in the fossil record anticipates the morphology of this new form ..." (p. 169). And yet, such an individual is found to use the same primitive tool kits (Mode 1 or Oldowan technology) as the much earlier Australopiths. Tattersall wonders why this is so and muses that the Mode 1 technology might just be a victim of its own success (p. 170). Similarly, it is a wonder to the author how Mode 2 technology, typified by the much more sophisticated Acheulean hand axe, could have been invented in Africa and would not arrive in Europe until fully a million years later (p. 172).

Homo heidelbergensis (600,000 years old), discovered in 1976 at Bodo in Ethiopia, is "the first truly cosmopolitan species" (p. 179), having been discovered in several locations in Africa, Europe, the United Kingdom and even China. The first shelters are associated with this species (at Terra Amata, France), and they may even have made certain wooden spears found in a bog in Germany (p. 179). Although the "cognitive revolution" begins here, there is little evidence of what Tattersall calls "the critical modern cognitive feature" (pp. 179-80), namely, symbolic intelligence. According to Tattersall, a central feature of the symbolic mind is the ability to construct an alternative reality that is "literally of its own creation" (p. 180), a rival world to the world of experience. This, the author believes, is the condition for art, science, religion and philosophy. *Homo heidelbergensis*, he claims, comes closer to, but did not cross, this cognitive divide.

Homo neanderthalensis (200,000-30,000 years ago) was a species endemic to northern Europe, which had branched off from its African origins over a half-million years earlier. They were highly skilled practitioners of the Levallois (Mode 3) technique of tool making (p. 183). Such productions clearly required a mental template of what was to be produced and a great skill in dislodging, with a single blow, the completed tool from the rest of the stone. Still, Tattersall maintains that Neanderthal tool-making displayed little innovation and is much the same wherever it is found. Though they appear to have invented burial of the dead, the author denies that their burials had any sort of spiritual significance. There is no clear evidence of grave goods in any Neanderthal burial site, and even the famous "flower burial" one at Shanidar Cave is ambiguous. He believes it is "highly doubtful" (p. 186) that Neanderthals had any sort of developed language.

Anatomically modern human beings have been found in Ethiopia and the Levant, dating around 195,000 years ago and later. At Blombos Cave in southern Africa, some of the first clearly symbolic artifacts show up, dated around 75,000 years ago. Here are found "a couple of ochre plaques engraved with regular geometric markings" (p. 190). Near this site are also found "small gastropod shells" (p. 190) notched with tiny holes and strung together to make a necklace. Such early jewelry undoubtedly had social significance. Once this sort of symbolic activity appeared, a threshold had been crossed. When it reappeared, "it was expressed with a vengeance" (p. 190).

A creative explosion occurred around 40,000 years ago with new, sophisticated tools and all manner of artistic creations—painting, engraving, sculpture, decorative embellishments on weapons and tools. There was music, too—on vulture-bone flutes! (p. 191). The lives of these people, the Cro-Magnons, "were drenched in symbol ..." (p. 192). According to Tattersall, the human mind was ready for symbolic thought, and it only required some sort of "cultural stimulus" to release the potentialities within it. That stimulus was the invention of language (p. 194). Tattersall does not believe that the brain was "made" for symbolic thought. Rather, it is an exaptation from a previous physical condition. In other words, the brain served some other purpose related to survival; language came along and conditions became ripe for the brain to be co-opted for this new function. This is one valid, if reductionist, way of explaining the matter.

So, says Tattersall, human beings are dual. One foot is in the biological world of instinct and survival; the other, in the cultural world of myth and symbol. Both come together in "a rather rickety general-purpose brain that happens to possess some remarkable capacities" (p. 196). The advent of symbolic thought is also at the origin of our spiritual life and yearnings. Because we are able to imagine other worlds, our thoughts and longings need not be restricted to immediate experience. Tattersall suggests that Cro-Magnon art was not only about this world, but also about an imagined world transcending this one.

Having broached the topic of religion, he completes this brief history with a statement of his belief that science and religion are not rival but complementary explanations of reality, "... underpinned by the same identical human

curiosity about the universe, and about our own place in it" (p. 204).

Highly recommended for all undergraduate libraries in the sciences and humanities.

Reviewed by Lloyd W. J. Aultman-Moore, Waynesburg University, Waynesburg, PA 15370.



PHILOSOPHY & THEOLOGY

DID ADAM AND EVE REALLY EXIST? Who They Were and Why You Should Care by C. John Collins. Wheaton, IL: Crossway, 2011. 192 pages. Paperback; \$15.99. ISBN: 9781433524257.

C. John ("Jack") Collins has written a timely book on the relationship between scripture and human origins. It comes in the wake of a controversy this past year at Calvin College regarding two professors who published papers in *PSCF* rejecting the historicity of Adam (September 2010: 179–95; 196–212). These papers were first presented at the 2009 ASA annual meeting at Baylor University alongside a paper by Collins defending the existence of Adam. And this book review is being written only days after the publication of a *Christianity Today* cover article entitled "The Search for the Historical Adam" (June 2011: 23–7).

Collins terms his view of human origins as "mere historical Adam-and-Eve-ism" (p. 14), echoing the famed C. S. Lewis book *Mere Christianity*. Though he states, "I am not endorsing any one scenario" (p. 14), by the end of the book, he certainly seems to hold a position. In beginning his argument, Collins is correct to deal with the critical question of the literary genre of the opening chapters of scripture. He offers four interpretive approaches:

- (1) The author intended to relay "straight" history, with a minimum of figurative language;
- (2) The author was talking about what he thought were actual events, using rhetorical and literary techniques to shape the readers' attitudes toward those events;
- (3) The author intended to recount imaginary history, using recognizable literary conventions to convey "timeless truths" about God and man;
- (4) The author told a story without even caring whether the events were real or imagined; his main goal was to convey various theological and moral truths. (p. 16)

Collins embraces the second category, but at this point fails to state whether "the actual events" were indeed real historical episodes. Eventually, Collins acknowledges a "historical core" of real events in the past (p. 35). However, he misses a fifth possible category, whereby "the author was talking about what he thought were actual events," but, in fact, these events never actually happened, because the author was reconstructing history from an ancient phenomenological perspective. In other words, this would be an ancient understanding of history similar to an ancient understanding of nature and science found in scripture. In failing to identify this fifth option, Collins loads his literary genre categories in the direction of his position.

This oversight is related to Collins's insistence that "timeless concepts" and "transcendent truths" cannot be

separated stories in scripture (p. 27). He sharply criticizes my view that the Bible has inerrant messages of faith that are transported by incidental ancient elements (pp. 34, 107; e.g., 3-tier universe). Once again, Collins sets up an assumption in order that his conclusion affirming the historicity of Adam follows. With this strategy, he attempts to argue that it is necessary to have a historical Adam if we are to believe that humans are created in God's image and that they are sinful. But what are parables? Heavenly messages delivered by earthly stories. The eternal truths in the parable of the Good Samaritan are not dependent on this account being historical. This can also be the case with Holy Spirit-inspired truths in Genesis 1–3 about the human spiritual condition. A person can reject the historicity of Adam and yet believe that he or she bears God's image and is a sinner. Interestingly, Collins betrays his early assumption late in his book when he introduces the categories of "world view" vs. "world picture" (p. 134), arguing that the Bible is more concerned with the former instead of the latter. Using Collins's categories, why could the ancient world picture of human origins (the *de novo* creation of Adam) not be separated from the world view (the belief in the image of God and human sinfulness)?

The core of Collins's argument is in the fourth chapter entitled, "Particular Texts That Speak of Adam and Eve." He lists well-known passages from the Old and New Testaments, in particular from Jesus (Matthew 19) and Paul (Romans 5 and 1 Corinthians 15). He also presents Second Temple Jewish literature. Collins contends that since Adam and Eve appear throughout these ancient texts, it only goes to show that they must have been real people. But this is not necessarily true. We can review this same literature for their astronomical statements and find that they present a 3-tiered world. Using Collins's argument from consensus, does this mean then that the cosmos actually has three levels? Of course not. I am sure that in this case, Collins would separate this ancient "world picture" of a 3-tiered cosmos from the essential "world view" that God created the heavens (Gen. 1:6–8; 14–19) and that they declare his glory (Ps. 19:1). Moreover, it should not surprise anyone that these texts have Adam at the head of humanity. In the ancient world, *de novo* creation was the best conceptualization of the origin of living organisms. In addition, ancient people extrapolate from their experience of expanding families and genealogies back in time to the beginning of creation. This along with the common motif of tribal formation explains why scripture, by necessity, arrives at an original human.

Chapter 5, "Can Science Help Us Pinpoint 'Adam and Eve,'" is the most interesting in the book. Collins opens with a criticism of the "problem of concordism," pointing to the failure of aligning nineteenth-century geology with scripture (pp. 106–7). Yet he does not seem to recognize that his "mere historical Adam-and-Eve-ism" is, in fact, a concordist approach—it derives a historic Adam and Eve from scripture and attempts to align them with modern science. More specifically, Collins contends that the "historical core" in Genesis includes the following: (1) natural processes alone cannot account for the origin of humans; (2) Adam and Eve are at "the headwaters of the human race"; (3) the fall was historical and moral (p. 120). From science, Collins draws evidence from genetics, which indicates the number of humans was never below

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1,000 individuals (pp. 12, 130), and paleoanthropology, which reveals that modern humans entered Australia about 40,000 years ago (pp. 17, 121, 124). Collins's concordist hermeneutic leads to a position with "humans as a single tribe" and "Adam as the chieftain and Eve as his queen" at least 40,000 years ago (pp. 121, 130). Interestingly, in the introduction of his book, Collins states that he intends to argue for a "traditional position on Adam and Eve, or some variation of it" (p. 13). But his Adam as tribal leader thesis is far from "traditional." Where in church history does this appear? In addition, the model is *ad hoc*. He accepts certain passages in Genesis as part of the "historical core," and then overlooks others. For example, Gen. 3:20 states, "Adam named his wife Eve because she would become the mother of all [Hebrew *cōl* means "all, whole"] the living" (NIV). Collins uses this verse in chapter 4 to establish the historicity of Eve (p. 62), but moves away from its historicity in chapter 5 because his tribe of 1,000 individuals could not possibly be descended from Eve. He attempts to mitigate the problem by focusing on the name of Eve as simply "Life-giver" (p. 125). But Collins betrays the context and ignores the explanatory clause in this verse. Eve is given her name "*because* she would *become* the mother of *all* the living." Concordism always fails because it is impossible to align ancient science (*de novo* creation) with modern science (evolutionary creation).

Jack Collins is an important voice within the evangelical science-religion community. Though I completely reject his concordist view of human origins, I certainly recommend that this book be read. Regrettably, it is marred by some irritating rhetoric (e.g., the back cover comment about those who doubt a historical Adam: "rarely are those doubts humbly subjected to serious scholarship"), but looking beyond this will reveal a wonderfully committed Christian wrestling mightily with the relationship between science and scripture.

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BROKEN WORDS: The Abuse of Science and Faith in American Politics by Jonathan Dudley. New York: Crown Publishers, 2011. 205 pages. Hardcover; \$21.99. ISBN: 978-0385525268.

Broken Words grabs the reader's attention from the very first sentence: "I learned a few things growing up as an evangelical Christian: that abortion is murder; homosexuality, sin; evolution, nonsense; and environmentalism, a farce." With this brief outline of his book, Jonathan Dudley starts a path through rethinking the "Big Four" ideas that may serve as the best characterization of evangelicals to the larger society. He takes on each in turn, and effectively ties together these four topics by showing that for each, a "simple reading" of scripture is actually an evolved history of interpretation: for each, the modern dogma reflects reactions against social, theological, and political issues separate from the issue itself; and for each, there is an element of rejecting science as a reliable way of understanding the world.

Dudley is well qualified to address these topics. He is the child of a well-pedigreed evangelical Christian family (many family members are Moody Bible Institute graduates) who knows from personal experience the weight placed on adherence to the "right" answers to the Big Four issues. He graduated with a biology degree from the evangelical Calvin College, and earned an MA in religion from Yale University's Divinity School. He is currently a medical student at Johns Hopkins University. Thus, he is well versed (and taught) in the science underlying these topics and has clearly spent significant time learning about the history and theology of the Big Four. The book is a strong argument because of Dudley's strong qualifications in both science and theology.

The most important contribution of the book may be the broad historical view of the hermeneutics behind the Big Four, and how these interpretations have changed over time. Other authors (Francis Collins, Keith Miller, Darrel Falk, and others) have written eloquently on resolving apparent conflicts between faith and science; Dudley shows how evangelicals ended up in these seemingly intractable conflicts in the first place. As an example, in the chapter on abortion, he provides some historical surprises for the reader: "The prevalence of abortion among Protestant women (versus mostly immigrant Catholics) is widely considered by historians to be one of the main reasons that physicians, worried that immigrant Catholics were out-reproducing their mainly Protestant social group, led the campaign to criminalize abortions in the late 1800s" (p. 41). More recently, post-Roe examples of Southern Baptist Convention resolutions in support of allowing abortion in cases of rape, incest, fetal deformity, and maternal health, as well as a call for repeal of anti-abortion laws by the Christian Medical Society, show how far evangelical opinion on the morality of abortion has changed in the last forty years. Dudley suggests and provides evidence that the change in evangelical thought was an outgrowth of a desire to influence politics surrounding the civil rights movement and women's rights movement by joining forces with Roman Catholics, rather than a long-standing understanding of scripture regarding fetal life.

Similar treatments of the issues of homosexuality, environmentalism, and evolution follow in the other chapters. While I found Dudley's chapter on environmentalism the least interesting, possibly because the topic is the least contentious of the Big Four, he makes a unique argument that the Bible is neither pro- nor anti-environmental, and Christians on both "sides" of the debate are abusing hermeneutics. Those who oppose the environmental movement often read the apocalyptic passages as predicting an end to the current creation, thus negating the need to care for the earth while it still exists. Environmentalist evangelicals are re-interpreting scripture in the light of their experience in the environmental movement, but have little support from the history of the church in their call for "creation care."

There are a few shortcomings in the book. It tends to be a bit repetitive, as there is a commonality to the approaches evangelicals take to the four issues treated in the book. A more complete reference list would have been nice for readers who want to explore more of the literature that Dudley used, but with a little digging using the endnotes, one's curiosity can be satisfied.

Overall, this book is an interesting, easy read. It very nicely traces the evolution of evangelical thought on the Big Four issues, and in so doing, points out the fallacy of a "simple reading" of scripture in isolation from the culture and issues of the day.

Reviewed by Robin Pals-Rylaarsdam, Biology Department, Benedictine University, Lisle, IL 60532.

THE POLKINGHORNE READER: Science, Faith, and the Search for Meaning by Thomas Jay Oord, ed. London: SPCK, 2010. 256 pages. Paperback; £14.99. ISBN: 978-0281060535.

ENCOUNTERING SCRIPTURE: A Scientist Explores the Bible by John Polkinghorne. London: SPCK, 2010. 128 pages. Paperback; £9.99. ISBN: 9780281062539.

Is there a God? How do we know? What is the nature of this God? And how does God interact with the natural world? These are the themes that have engaged John Polkinghorne these past thirty years or so, and they are well addressed in these two volumes, which encapsulate the provocative thinking of this remarkable scientist-theologian. For the unlikely uninitiated, Polkinghorne was professor of mathematical physics and later president of Queens' College, Cambridge University, as well as an Anglican priest and Canon Theologian of Liverpool Cathedral, and the 2002 winner of the Templeton Prize for Science and Religion, and the author of numerous other books, many of which have been reviewed in these pages. Oord is professor of theology and philosophy at Northwest Nazarene University and the author of other books on the intersection of science and religion.

First, a word about editions: Both of these books were published in Britain by the Society for the Promotion of Christian Knowledge (SPCK). *The Polkinghorne Reader* was also subsequently published in the USA by the Templeton Press in a slightly different format.

Second, a word about the distinction between these two volumes. *The Polkinghorne Reader* is the more substantial, in both size and effect, of the two, for as its title suggests, it is a compilation of the author's best or most helpful writing on the intersection of faith and science. Polkinghorne cooperated with Oord in the selection of the pieces, which are arranged thematically rather than chronologically. It is organized into three parts: "The World," "God," and "Christianity," with seven or eight selections in each part. While not technical, it is written for the educated reader, one with some familiarity with theology or science. *Encountering Scripture*, on the other hand, is a shorter, more narrowly focused explication of Polkinghorne's understanding of the nature, role, and interpretation of scripture. It is written as a soft apologetic, primarily for the lay or general reader who might be intrigued to hear how a noted scientist-theologian approaches some of the thorny questions about the meaning of scripture.

In both volumes, Polkinghorne is more the theologian than the scientist, although he is continually attempting to stand between the two camps and link them together by noting common quests for truth and common patterns in their efforts. He humbly claims lay status as a theologian (see, for instance, his Gifford Lectures) but his ponderings

are astute and reflect a well-read mind. Because his scientific profession addressed mathematical physics, little of that finds its way into these writings. When he speaks of science, it is largely to draw analogies between quantum theory and the epistemological challenges of knowing and understanding God. Beyond the fundamental epistemological question, his central theological concern is to understand and articulate the interactions of God in the world in terms and frameworks that are credible and relevant to a contemporary secular audience; along the way, he also addresses the corollary questions that result from that one, including how creation is to be understood, how God reveals himself, and the problem of evil (theodicy).

Regarding these central theological questions, it might be helpful to summarize Polkinghorne's thought, as presented in these volumes. First, he is an advocate for a kenotic Christology, a long tradition, recently revived (see *Exploring Kenotic Christology* by C. Stephen Evans), that stands between classical Christology (of the Chalcedon Definition and Thomas Aquinas) and process theology (of Alfred North Whitehead). Following the lead of Jürgen Moltmann, Polkinghorne's favorite theologian, who wrote of a "crucified God," Polkinghorne is attracted to an understanding of a self-emptying God who incarnates as a fully flesh-and-blood human being in Jesus. Second, Polkinghorne's attraction to a kenotic Christ runs parallel to his understanding of continuous creation, in which the Creator continues to engage and form the created world in cooperation with human beings. As to where and how such interactions between Creator and creation take place, Polkinghorne provocatively suggests that something akin to the indeterminacy that happens on the quantum level when an observer is present might occur on a macro level as well.

Third, for Polkinghorne, this image of a God who limits himself and who engages his creation provides at least a partial solution to the problem of evil, for he imagines a God who does not know the future (cf. open source theology) and who therefore encounters and addresses evil alongside of and in cooperation with humans. Fourth, Polkinghorne believes that God has revealed his presence and his character in scripture, although he eschews an evangelical or fundamentalist understanding of direct, literal inspiration for what might be best understood as a neo-orthodox hermeneutic.

There's more ... much, much more than a brief review can summarize or address and, of course, the books are available for those who wish to read more and deeply. Readers of this journal will be unlikely to find *Encountering Scripture* to be very helpful, unless one wishes an introduction to biblical hermeneutics. *The Polkinghorne Reader*, however, is a well-organized and delightful volume, wide-ranging in its topics, insightful in its arguments, and marvelously edited so that the passages flow rather seamlessly and coherently, despite their different sources and chronologies. If one has all or most of Polkinghorne's writings on one's shelf, this would be an unnecessary redundancy; if, however, one wishes to have a distillation of his thought, this is an excellent, inexpensive alternative.

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

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INTELLIGENT DESIGN UNCENSORED by William A. Dembski and Jonathan Witt. Downers Grove, IL: Inter-Varsity Press, 2010. 175 pages. Paperback; \$15.00. ISBN: 9780830837427.

This book is divided into two major sections: chapters 1–4 cover the basic arguments for intelligent design (ID) and chapters 5–7 focus on ID as an apologetic against materialism. There is little new here, but it is a good place to start if you are new to ID.

Chapter 1 “Fantastic Voyage” is an introductory, delightful, and fanciful voyage into the inner workings of the cell through a Sci-Fi miniaturization scenario.

Chapter 2 “The Design Revolution” is a brief description of Darwinism and particularly its alleged failure to account for the observation that the universe appears to be fine-tuned for complex life. After glibly dismissing the weak anthropic principle and multiverse proposals, Dembski and Witt propose ID as the most reasonable solution.

I was pleased to see Dembski and Witt recognize that all biologists acknowledge design. Biological structures have a function and perform a particular role in the cell. Philosophers of biology have long reflected on this. Therefore, ID has no unique claim on design. The dispute is not over whether design exists, but whether evolutionary processes could have designed the object.

Chapter 3 “The World’s Smallest Rotary Engine” is the frequently seen chapter on the bacterial flagellum. Much of the chapter is devoted to refuting the criticisms of theistic evolutionist/evolutionary creationist (TE/EC) Kenneth Miller. Nonetheless, I find Miller’s argument persuasive—that a subset of the flagellar machine that makes up the functional Type III Secretory System is proof that the general idea of co-option is a feasible explanation. It does not matter which came first.

Chapter 4 “The Design Test” presents the design threshold, the probability below which something is considered to be designed. It seems that the probability calculation for the cell as a whole is based on the untenable belief that the whole is assembled at random from a collection of all the constitutive molecular parts. First, there are physical and chemical properties that dictate much of the assembly process; it is not really random. Second, this approach assumes that there is no step-wise assembly. Some aspects of these structures are dependent on previous steps having occurred. To illustrate: the probability of getting two heads when two coins are flipped is 0.25, but the probability of getting two heads, when one of the results is already heads, is 0.5. Biological processes and similar processes likely to be involved in the origin of life are much more like the sequential coin flip. Third, evolutionists never say that the evolutionary process is random. Aspects of it may involve processes that approach random (nucleotide substitutions, recombination, random assortment of chromosomes, etc.), but self-organization, natural selection, environmental contingency, etc., are not random.

Dembski and Witt say that the origin of information is the critical problem in biology. They review several non-ID proposed solutions and find them all lacking. Here are two examples of rather technical arguments

that they present that seem persuasive to the casual, non-expert reader, but are not to the more expert reader.

They argue that molecular phylogenies, as a general rule, are an unreliable argument for evolution from alleged problems with sequence comparisons involving the vitamin C synthesis gene (GULO). Evolutionists have argued that the existence of the nonfunctional GULO pseudogene in primates in the context of functional GULO among other mammals is strong evidence for common ancestry. Guinea pigs, far off the primate branch, also have a nonfunctional GULO pseudogene. It turns out that a larger than expected number of the mutations is common between the distantly related guinea pig and human, suggesting a mutational hot spot in this region (no one would suggest that primates and guinea pigs are close relatives, based on other comparisons). Following arguments of Jonathan Wells, they argue that, in a similar manner, each of the primate nonfunctional GULO pseudogenes could have arisen independently and that this is an equally parsimonious model. The claim for equal parsimony is suspect, even if the hot spot argument is legitimate, but to argue that this example results in doubt being cast on the whole molecular phylogeny enterprise is unwarranted.

They argue that the mutagenesis research of Douglas Axe, which concludes that functional folds in proteins are extremely rare and that it is not possible for new folds to originate from other folds, makes evolution impossible. The research of the Brian Matthews group with T4 lysozyme leads to a different conclusion. One of the reasons for the differing conclusions is that Axe uses catalytic function to assess proper folding rather than mere folding. It seems to me that functional folds (that is, folds with enzymatic function) are a small subset of properly folded proteins. (Axe seems to make the opposite assumption.) We would expect modern proteins to have evolved to be distant from each other in folding space, so that they fold up into their unique structure. Indeed, dysfunction results when proteins fold up in alternate conformations as in amyloid diseases—proof, interestingly, that some “folding islands” are not so distant from others. A less modern protein would have a lower stability (be less likely to be in the folded structure at a given time) and may even have multiple conformations. I also have serious doubts about Axe’s key calculation of 0.38 as the probability of having a suitable amino acid in a given position. Our experience with T4 lysozyme mutagenesis suggests a much higher number for most positions. In addition, his assumption that that probability applies to all residues is most likely wrong.

The final three chapters are devoted to apologetics questions and are evidence that ID is motivated substantially by the apologetic agenda. There is much to commend in chapter 5 “The Poison of Materialism,” for indeed, much of the modern intellectual marketplace is rooted in this anti-Christian worldview. But Dembski and Witt fall prey to the problem of not distinguishing between evolution as a scientific theory and evolution as a comprehensive worldview. It is possible to be an evolutionist with respect to some set of biological theories and *not* be a materialist. Evangelical critics of evolution and atheists both commit this error.

Chapter 6 "Breaking the Spell" is Dembski and Witt's attempt to debunk theistic evolution/evolutionary creation, which they tend to caricaturize as being deistic. Rather, most who hold this position would say that God is involved moment by moment in upholding and governing the universe he created – far from a deistic view. That this universe operates according to regularities detectable by us is evidence of faithful and regular governance, not autonomy, not materialism. There are some theists who would even claim that everything is designed. Distinguishing between such a creation and a materialistic world is a matter of theological commitment and not empirical evidence.

Chapter 7 "The Book of Nature" includes strategies for would-be ID scientists to navigate the anti-ID biased waters of today's academia. The advice is to not let anyone know of your beliefs until you have tenure ("loose lips sink ships"). This approach seems ill-conceived. Receiving tenure might guarantee a permanent university position, but it does not guarantee permanent grant support or circumventing peer review in future publications. Tenured scientists with unconventional ideas may keep their university positions, but they quickly lose the respect and support of their peers. Science is not a democracy and free speech about science in the scientific literature is not a civil right among scientists.

With such a fundamental difference in worldview, ID might be better served by building their own institutions of research, teaching, etc., similar to the Christian school and college enterprise. Even if the old guard is never convinced, the new institutions, if successful, would displace the old.

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SCIENCE AND RELIGION: Are They Compatible? by Daniel C. Dennett and Alvin Plantinga. New York: Oxford University Press, 2011. 82 pages, foreword, index. Paperback; \$9.95. ISBN: 9780199738427.

This book is an extension of a formal debate between two American philosophers, Alvin Plantinga, an explicitly Christian analytical philosopher once described by *Time Magazine* (1980) as America's leading orthodox Protestant philosopher of God, and Daniel Dennett, an internationally acclaimed philosopher of mind and one of the "Four Horsemen of New Atheism." The original debate took place in 2009 at the American Philosophical Association Central Division Meeting in Chicago.

The title of this volume would, reasonably enough, lead one to expect a debate revolving around the question of whether the central claims of science and religion ultimately come into conflict or perhaps even contradict each other. This, however, is not what one actually finds. In fact, the title of the volume (and the originally billed debate) is somewhat misleading. The debate is not about whether science and religion are compatible. Plantinga and Dennett both agree they are compatible. Plantinga contends not only that science and religion are compatible, but that the rational embrace of science's claims restsulti-

mately upon epistemic presuppositions that derive from Christian theism; Dennett, on the other hand, thinks that the mere logical compatibility of science and religion is trivial, and argues that a truly scientific understanding of the world makes it impossible *rationally* to accept Christian theism. So this debate does not focus on science and religion's compatibility, but on two rather more interesting but much less general questions: (1) Does Christian theism deserve more rational credence than that typically apportioned to superhero tales? (Plantinga says "yes"; Dennett says "no"); and (2) Is Darwinian evolutionary naturalism (i.e., the view that the process of species descent is driven by natural *unguided* selective forces operating on random mutations) able to supply a rational basis upon which to trust the reliability of the very cognitive faculties that have led to this belief? (Plantinga says "no"; Dennett says "yes").

Regarding the first question, Plantinga affirms that contemporary evolutionary theory is compatible with Christian theistic belief, since contemporary evolutionary theory, properly understood, does *not* rule out the possibility that God guided evolutionary processes to yield human beings (p. 2). Dennett agrees that contemporary evolutionary theory does not prohibit theistic guidance nor can it demonstrate the absence of divine design (p. 27), and thus Christian theism and evolutionary theory are logically compatible. But Dennett insists that their mere logical compatibility supplies no rational grounds warranting appeal to deity for explanatory assistance; in fact, he ridicules such a tactic as garnering no more rational warrant than a silly appeal to Superman supervising evolutionary descent (pp. 28-9), and claims further that atheism is the tacit yet fundamental assumption required to secure the closed system of physical causes underwriting current practices of science and courts of law (p. 31). Plantinga counters, noting that holding a hypothesis that does not entail theism is very different from assuming atheism (p. 42). Dennett then claims that the only reason Plantinga takes theism more seriously than Supermanism is that his Christian faith has biased his imagination (p. 46) and compares Plantinga's biased imagination to the imaginings of a half million people who believe in the existence of the angel Moroni's golden tablets (p. 47). Plantinga responds by explaining to Dennett the important difference between necessary and contingent beings and how this difference makes no small difference when it comes to the rationality of belief in Christian theism as opposed to belief in Supermanism (p. 58).

In reference to the second question, Plantinga believes that although there is no conflict between Darwinian evolution and Christian theism, he does believe that naturalism (of the sort Dennett holds) and science are incompatible (p. 70), despite their apparent concord. One cannot rationally accept both (p. 17). Dennett's (and others') quasi-religious naturalistic worldview entails an evolutionary process entirely driven and shaped by the non-rational forces of chance (random mutations) and necessity (survival of the fittest). Plantinga argues that belief in both naturalism and evolution yields a very low probability that our cognitive faculties are reliable (p. 17), i.e., that we can trust them to track truth and not merely endow us with beliefs that improve our chances of survival (p. 19). Since beliefs do not have to be true to confer

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survival value, anyone who believes that evolutionary naturalism accounts for the ascent of humans with all our capacities and faculties, also has an excellent reason *not to believe* that this belief is true. (And, of course, it is irrational to believe something about the causes of all one's beliefs that make truth irrelevant to their output.) Dennett does not accept Plantinga's argument that the conjunction of beliefs in naturalism and evolution is self-defeating, because although it is true that biological evolution has (over millions of years) "designed" our belief acquisition modules to promote user survival, it is also true that *cultural* evolution has (over thousands of years) honed those survival-conducive beliefs to home in on truth (pp. 35–6).

The enduring value of this book will not come from its contribution to the debate about the compatibility of science and religion, but will much more likely come from the clarity with which it shows the epistemological import of our beliefs about the origins of our species: how what we believe about the originating causes of our beliefs seriously affects how seriously we can rationally take any of our beliefs.

Reviewed by Robert P. Doede, Associate Professor of Philosophy, Trinity Western University, Langley, BC V2Y 1Y1.

TEST OF FAITH: Spiritual Journeys with Scientists by Ruth Bancewicz, ed. Eugene, OR: Wipf and Stock Publishers, 2010. 120 pages. Paperback; \$18.00. ISBN: 978-1608998944.

This book will inspire and motivate Christians in science and indeed anyone on a journey "of reconciling" their faith with current scientific understanding of the natural world. *Test of Faith* presents a collection of spiritual journey essays—selected, compiled, and organized by the editor, Ruth Bancewicz—from highly respected scientists who profess a deep Christian faith. Bancewicz is a research associate at the Faraday Institute and has spearheaded the Test of Faith project since 2006. The project aims to provide relevant resources about Christianity and science and, most importantly, to make them accessible to everyone. This book is one of those resources.

The book serves two main purposes. First, it unambiguously establishes that faith and science are compatible and, in fact, complement and inform each other in a way that strengthens both. Second, it provides people in science with examples of how their Christian faith can guide them in their daily work serving the Lord.

In an open manner, *Test of Faith* speaks to a common misperception that science and faith are in opposition to each other. With the recent rise of the so-called "new atheism" movement and the publication of many best-selling atheist books, there are people asserting that a scientific worldview is incompatible with a belief in a personal God. Yet, as Bancewicz points out in her introduction, "there are a huge number of scientists who are also Christians, and hundreds of books have been written explaining how faith and science fit together" (p. xii). This book presents a positive affirmation of faith with essays that are sincere,

nonantagonistic, and respectful of other faiths and atheistic perspectives.

Bancewicz carefully selected ten prominent scientists from a range of scientific disciplines including physics, astronomy, molecular biology, neurobiology, and computing science, as well as from a diversity of upbringings; some began their career as atheist or agnostic, others as strongly rooted Christians. While simultaneously producing a well-balanced compilation of stories, this book provides counterbalance to some of the more prominent "new atheists" through contributions from Christians who are experts in the same scientific disciplines. For example, Francis Collins is a molecular biologist with a thorough understanding of evolutionary theory; he provides a Christian perspective of life's origin that counters the arguments presented by atheist Richard Dawkins. Alasdair Coles and Bill Newsome, both neurobiologists, admirably counter neuroscientist Sam Harris, author of *The Moral Landscape*. Coles and Newsome assert that morality cannot be explained on the basis of science alone, and that a person must search for a balance "... where you can be modern and intellectual and yet be open to emotional meaning that transcends the logic to some extent or at least complements the logic" (p. 50). Similarly, Ard Louis, John Polkinghorne, and Deborah B. Haarsma serve as voices against the criticisms from physicists Victor Stenger and Stephen Hawking who posit that a solely scientific explanation is sufficient to explain the origin of the universe. Polkinghorne eloquently states that "if you look at these laws, their rational beauty, their order, their fruitfulness, their 'fine-tuning,' they do seem to point beyond themselves" (p. 89). The Christian physicists each acknowledge the existence of different types of truth, different yet significant ways of knowing—what Ard Louis refers to as "deeper logic" (p. 72).

The personal stories shared in *Test of Faith* illustrate how faith influences career paths, guides research directions, and informs day-to-day interactions in the lab and classroom. For example, Bill Newsome coherently addresses how faith informs how he mentors students in his lab. His story sheds light on how Christian higher education may differ from non-Christian higher education and will prove useful for academics and those considering entering post-secondary education. John Bryant focuses on bioethics and how Christian ethics can help inform how we choose to respond to the momentous advances in technology and science.

While this book will appeal to anybody who has pondered the link between science and faith, readers who are interested in a deeper discussion of Christian ethics by some of the same contributors may turn to *Real Scientists, Real Faith* edited by R. J. Berry. Other resources offering a fuller exploration of some of these issues are available through the Test of Faith website (www.testoffaith.com). Nonetheless, the limited depth in this book is certainly appropriate given its purpose and target audience. Each author describes some of the resources that were personally valuable on their own journey. Yet, to strengthen this collection, the editor might have appended a more comprehensive list of useful resources on specific topics, particularly a list of publications from each author (e.g., Francis Collins's *The Language of God*).

I recommend *Test of Faith* to anyone interested in the interaction between Christian faith and science. This book has something for everyone. Christian academics may identify with the inspirational stories. New faculty members will find that the contributors make great role models. Readers who are embarking on a Christian path will appreciate the personal stories from John Polkinghorne and Deborah B. Haarsma, who both aim to find common ground among divergent faith perspectives. The book should be recommended reading for Christians who are considering a career path in science, as well as for parents and family members interested in learning where those career paths might take them spiritually. Yet most importantly, *Test of Faith* would be ideal for the lay public who are continually bombarded with the unfounded assertions of high profile atheists. Here is a valuable resource that can be used by church leaders and church groups to begin a reassuring discussion among the faithful that science is not antithetical to their beliefs and values.

Reviewed by Keri McFarlane, Assistant Professor of Biology, The King's University College, Edmonton, AB T6B 2H3.

SUPERNATURAL SELECTION: How Religion Evolved
by Matt J. Rossano. Oxford: Oxford University Press, 2010.
304 pages. Hardcover; \$29.95. ISBN: 9780195385816.

Supernatural Selection is an extended analysis of how humans became religious. Matt Rossano explores the topic, using recent findings from a variety of fields—anthropology, archaeology, biology, developmental human biology, neuroscience, philosophy, primatology, psychology, and sociology among others—to weave an intriguing examination of religion and human evolution. Essentially, he regards religion as a social phenomenon. At its core, he argues, it is “fundamentally relational,” involving relationships between humans as well as between humans and the supernatural (pp. 19, 34). Consequently, he contends that, because of its experiential base, religion is beyond science. To support his argument, Rossano narrates the development of religion from ritual to shamanism to compelling myths.

I expected a hard-hitting dogmatic exposé of religion. What I found was much more interesting. Rossano often discusses evidence with phrases such as “this suggests that,” “this study has found that,” “though interpretations ... differ,” “we must be cautious that,” “lends further support to the notion that,” and “however, this does not mean that.” I found that this relaxed procedure disarmed my suspicions. However, later in the book, these qualified pieces of evidences are used as givens. Depending on his or her background, each reader will question different pieces of Rossano’s evidence. For example, in an attempt to describe religion’s primitive traits, Rossano uses phylogeny noting that humans and chimpanzees share many traits in common. He concludes that these traits were probably present in the ancestor of both species. This is standard phylogenetic theory. However, he then uses the same logic to look at the traits of religion that are shared across human societies. This leap from biological traits to cultural traits Rossano makes smoothly, without much equivocation. Given the vast difference between cultural

and biological evolution, I found it difficult to make the same jump, much less with the same ease.

In fact, creationists with a short time model (“young earth creationists”) will find the first seven chapters problematic. For example, Rossano states “Sometime between ... (about 100,000 ybp) and ... (about 35,000 ybp), some of our ancestors thought up the idea of a supernatural world” (p. 60). Young earth creationists will want to pack all of human prehistory into a short time (less than ~4,000 years). On the other hand, creationists with a long time model will find the book extremely thought provoking. Was the supernatural realm invented or discovered (or revealed)? Rossano provides only a narrative for invention. Someone needs to use the same body of evidence and argue for an alternative hypothesis.

In the eighth chapter, “Religion and Morality,” Rossano argues for importance of religion in the understanding of morality. In fact, he spends several pages on developing “moral expertise,” which will be of value to anyone interested in spiritual growth. I was surprised by the amount of evidence that he amassed to support his assertion that religion was and is extremely valuable. For example, he contends that it is key to the survival of anatomically modern humans.

Furthermore, the book is scholarly. Twenty-five pages of notes plus 50 pages of references alone will have me returning many times to its pages. Chapter nine focuses on the testability of his argument. He makes five general predictions (plus a few minor ones) and notes how the evidence up to now supports elements of his predictions. In addition, he discusses how his model could be refuted. I found both the predictions and potential refutation refreshing.

However, not everything that Rossano contends is crucial for his argument. For example, he sees the super-eruption of Mount Toba as nearly wiping out humans. This idea is in contrast to the view of Michael Balter, who, in his report on a conference (*Science* 327: 1187–8) that examined the Toba eruption, notes that the experts disagreed on its impact. Rossano presents his position as unequivocal when it is not. Additionally, a more sophisticated view would see the early years in Africa as often threatening the existence of the human species (e.g., James L. Boone, “Subsistence Strategies and Early Human Population History: An Evolutionary Ecological Perspective,” *World Archaeology* 34 [2002]: 6–25). However, these modifications do not detract from his overall argument.

Not only is the book scholarly, but also it is well written. Rossano entertains his readers not only with his appeal to critical inquiry, but also with his incorporation of humor. Furthermore, he often sums up his discussion and provides abundant subheadings to keep the reader orientated. As a result, the reader knows where Rossano has been and where he is headed.

Overall, this is a valuable book, and I look forward to reflecting further on Rossano’s arguments and seeing how its predictions withstand future evidence.

Reviewed by Bruce Buttler, Professor of Biology, Canadian University College, Lacombe, AB T4L 2E5.

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SCIENCE AND THE SPIRIT: A Pentecostal Engagement with the Sciences by James K. A. Smith and Amos Yong, eds. Bloomington, IN: Indiana University Press, 2010. 217 pages. Paperback; \$24.95. ISBN: 9780253222275.

This is a very interesting collection of articles that explore questions of spirituality in the light of contemporary science and technology. These are crucial issues for today with our culture seeking real answers as to how it can have an authentic and Spirit-empowered faith that is also consistent with the exciting discoveries of modern science and the challenges that arise with cutting-edge technologies. The contributors deliver insightful ideas on a wide range of topics at the interface of science/technology and Pentecostal theology. The book is divided into three sections, with three articles in "Part One: What Hath Azusa Street to Do with MIT?" There are four articles in "Part Two: The Spirit of Matter: Questions and Possibilities in the Natural Sciences," and three articles in "Part Three: The Human Spirit: Questions and Possibilities in the Social and Technological Sciences." Prior to these ten chapters, the editors provide a brief introduction to set the stage for this emerging conversation between Pentecostalism and science. The articles are meant to be comprehensible to the undergraduate student while also offering penetrating analysis of the tough questions facing this frontier from a scholarly perspective. They achieve a good balance in this regard.

In Part One, chapter one, Telford Work explores scientific knowledge in theological context. He catalogs western Christian responses to the rise of scientifically inspired cosmologies and then offers his own ideas regarding an "obscure" plan of God. He suggests a "scientific and spiritual gift exchange" and writes that the quest for holiness can benefit from evolutionary science. In the second chapter, James K. A. Smith dives into the thorny question of scientific methodology for the Pentecostal believer. After providing helpful definitions and distinctions up front, he asserts that there is nothing inconsistent about working from a Pentecostal worldview and affirming a kind of methodological naturalism (MN). However, in the light of God's activity in continuously holding all things together, a Pentecostal ontology might force one to reject MN in terms of both "closure" and "intervention." In the third chapter, Amos Yong provides Pentecostal perspectives on current models of divine action. He discusses Polkinghorne's model of God acting through chaotic systems at the quantum level, but admits that it may be a mistake to insist that divine action is even observable and measurable by humans. He proposes a pneumatological theology of divine action with several interesting theses, including the idea that the laws of nature are more loose than rigid, allowing nature to still surprise us, and the idea that divine action must be understood eschatologically and teleologically with reference to God's purposes in advancing the kingdom.

In Part Two, chapter four, Wolfgang Vondey explores the relationship between physics and theology and concludes that they need not be separate, emphasizing that methodology is the key, and referencing concepts of "spirit" held by both Newton and Einstein. He suggests that a Spirit-oriented approach may lead to a reconsideration of current methodology (MN), with the goal being

to discover the role of the Spirit in the origin, availability, and distribution of reason in the universe. His assertion that the Spirit-filled physicist will operate on a different level than a "carnal" scientist, being able to discern hidden things as the Spirit reveals, will be hard for some readers to swallow. This article could have benefited from more interaction with Smith's article in chapter two and vice versa. In the fifth chapter, Steve Badger and Mike Tenneson do a good job of describing the current positions on creation, and also provide some helpful statistics indicating a shift from young earth to old earth and evolutionary creationism. However, the smaller number of respondents in the more recent poll casts some doubt on the significance of these results. They describe the positions of various Pentecostal denominations and encourage researchers to remain open to the active, ongoing, creative role of the Spirit in nature. In the sixth chapter, Frederick Ware addresses the question of whether religious experience can be reduced to brain activity. He explores the idea that "self-transcendence" may function as a telos of consciousness. He then suggests a multifaceted approach in which reductive materialism is abandoned, narrative is significant, and hypotheses are formed and tested in the light of metaphors and other structures disclosed in narratives of conscious experiences. In the seventh chapter, Donald Calbreath proposes a holistic Pentecostal approach to mental illness, exploring the issue of depression from both medical and spiritual perspectives. Causes and treatments are explained and critiqued. An integrated model is proposed with information on various options available for those dealing with depression.

In Part Three, chapter eight, Craig Scandrett-Leatherman provides a personal discussion of his participation in science, Spirit, and social reconstruction as an anthropologist and Afropentecostal. He stresses the role of participation in science and how humans are changed in the process. By exploring the cases of Frank Cushing, Michael Polanyi, and Victor Turner, he promotes healing and transformation through participation in community rituals and in the ways and disciplines of elder experts. In the ninth chapter, Margaret Poloma explores the possibility of integrating Spirit and sociology from a personal and postmodern perspective. She claims that other ways of knowing, beyond science, are valuable and measurable, and that a postmodern view can lead to more openness to Christianity. Her current research shows great potential in studying the "dynamic interaction between divine and human love that enlivens benevolence." In the final chapter, Dennis Cheek addresses the question of how Christians should approach the design, appropriation, and use of technologies to satisfy human wants and needs. Being an engineer, and convinced that engineers have significant contributions to make to the science and theology dialogue, I felt that the editors had saved the best for last. To my delight, drawing heavily from his recent doctoral dissertation on "Theology and Technology," Cheek explores God's role as a systems engineer. Recognizing our duty as creation stewards, he outlines the beginning of an appropriate Christian response to technology.

Each of these papers is helpful in addressing crucial questions at the interface of science and Pentecostal spirituality. The book is a valuable resource for those who dialogue with scientists, engineers, and interested others

about the potential for a Spirit-empowered faith that is simultaneously concerned with scientific integrity and careful stewardship of technology.

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**THE TRINITY AND AN ENTANGLED WORLD:
Relationality in Physical Science and Theology** by John Polkinghorne, ed. Grand Rapids, MI: Eerdmans, 2010. 232 pages. Paperback; \$30.00. ISBN: 9780802865120.

Sir John Polkinghorne is one of the leading figures in advancing the science/theology dialogue. This book, which is a collection of essays presented at two different conferences sponsored by the Templeton Foundation and edited by Polkinghorne, moves the discussion to a deeper level by examining the interplay between relational theology and quantum theory. The motivation for considering these two apparently disparate subjects resides in the concept of holism.

In quantum theory, holism is manifest in the property known as "entanglement." Entanglement expresses the idea that two systems can be more strongly correlated than would otherwise be possible were classical (i.e., nonquantum) physics a sufficient framework for describing physical law. It can be illustrated by the following example. Consider two fair coins, one held by Alice and the other by Bob. Now suppose that Alice and Bob each flip their coins 1,000 times in sequence and record the outcomes. We would see about 500 heads (H) and 500 tails (T) for each, as expected from the normal laws of probability. If we looked at them pairwise, we would see about 250 HH combinations, 250 HT combinations, 250 TH combinations, and 250 TT combinations, where the first letter is Alice's result and the second is Bob's. No surprises here either: since the coins are fair, each combination should appear about 25% of the time. Now suppose the coins are entangled. There are many ways of doing this, so for definiteness, let us pick one: we will say that when Alice gets H, so does Bob; and when Alice gets T, so does Bob. Repeating the above experiment, we will find that we get about 500 HH combinations, 500 TT combinations, but no HT or TH combinations: in this sense the correlations are not random. Yet if we consider just Alice's results alone, we will find that H and T occur in random order about 500 times each, with the same situation holding for Bob's. In other words, the entangled coins individually behave as though they were fair, but taken together, they behave as though they were biased. The pair of coins (which in actual experiments would be a pair of electrons or a pair of photons) as a system is literally greater (i.e., has richer information content) than the sum of its parts.

The Trinity is a theological concept used to express the relationship between God, Christ, and Holy Spirit, one that affirms simultaneously both the individuality of each person and their indissoluble unity. The term *perichoresis* further expresses co-indwelling, co-inhering, and mutually interpenetrating. Each person in the Trinity shares in the life of the other two, yet each has its own distinct manifestation and forms of expression.

Are there interpretative lessons that each discipline can learn from the other? Is there a meta-message that quantum entanglement has to teach us about a deeper structure to reality? Is a theology that emphasizes the relationship within the Trinity a more appropriate foundation for all of Christian faith? These are the kinds of questions this book addresses.

While the scientific contributors to this volume tend to concentrate more on explaining the basic science of entanglement than on making theological or philosophical comments about its implications, they do not shy away completely from this task. There are also essays that go beyond physics and theology, venturing into implications for sociology and cosmology.

One of the more refreshing aspects of the book is how it draws together insights from Protestant, Catholic, and Orthodox perspectives. The Orthodox perspective plays a particularly prominent role, with quite a number of the contributors commenting on the Trinitarian insights drawn from that tradition. I learned from several of these essays, and found that they enriched my faith.

While I enjoyed reading this book, I would caution that it is not an easy read. It will make a number of intellectual demands of any reader—scientifically, theologically, and philosophically. However, it is a rewarding read for those that are willing to put forth the effort.

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WIRED FOR GOD? The Biology of Spiritual Experience by Charles Foster. London: Hodder, 2010. 352 pages. Hardcover; \$23.95. ISBN: 9780340964422.

Readers of *PSCF* are undoubtedly aware of emerging discussions about whether (and how) findings in neuroscience and psychology bear on matters of Christian faith. Indeed, a sizeable collection of neuroscience-related articles has graced the pages of *PSCF* over the last several years. And, as Matthew S. Stanford stated in his guest editorial in the neuroscience-themed June 2010 issue, "[the] points of intersection between psychology, neuroscience, and issues of faith are immense and increasing every day" (*PSCF* 62, no. 2 [2010]: 73).

Charles Foster's *Wired for God? The Biology of Spiritual Experience* is a survey of the diverse array of human spiritual experience viewed in the light of advances in cognitive neuroscience. It is necessary to clarify, however, that the author's subject is not everyday religious belief. Instead, his focus is on what happens in the brain during profound mystical experiences and on what conditions might aid one in having such experiences. Thus, the central thesis of the book is that "[there] is undoubtedly some correlation between some of the things that go on inside our brains and the experiences we call 'religious'" (p. 11).

Some readers may instinctively balk at the idea that there are neural correlates of spiritual experiences, supposing that such material explanations obviate any genuinely spiritual content of the experiences. However, throughout the book, Foster is adamant that such

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a supposition would be a mistaken and misguided lapse into the wrong kind of dualism (he advocates for a different version of dualism in the appendix), arguing instead that “the corporeal and the incorporeal are intimately related” (p. 80). It should be a comfort to Christian readers that while Foster seeks to describe the material circumstances of religious experience, he pointedly allows for the possibility that such experience is still grounded in a spiritual reality.

Foster approaches the book with a combination of scientific evidence, witty argument, and philosophical musing. His chapters, each in turn, address mental states that resemble spiritual experiences, as well as various means used to attain spiritual experiences: hypnosis, meditation, mental illness, genetics, psychoactive drugs, sex, near-death and out-of-body experiences, hunger, and sleep deprivation. Additionally, he spends a chapter discussing evidence that profound spiritual experiences in ancient human history, most notably those wrought by psychoactive substances, may have been a precursor to modern everyday religion. A discussion of what Foster terms “The Terrible Problem of Consciousness” is deferred to an appendix to avoid bogging down the flow of the book with his especially technical argument.

This book is meant to be accessible to the lay reader; the writing is conversational and highly entertaining at most parts and downright gripping at others. The chapters are short, and Foster avoids overwhelming readers with nitty-gritty details of the science. In most respects, these are strengths for a book directed at an audience with a limited scientific background.

That said, it seems that in an effort not to tax the reader with too much scientific detail, Foster avoids it almost altogether. This lack of scientific detail, nitty-gritty or otherwise, is a gaping hole in this book’s argument. For a book that promises to describe “The Biology of Religious Experience,” it is disappointingly short on the biology. For instance, in chapter 6, “Finding God in a Garden,” Foster describes the vast array of psychoactive drugs used in both ancient and modern societies and how their effects either mimic spiritual experiences—as with the consciousness-transforming effects of LSD—or are used as aids to spiritual experience—as with peyote use in the Native American church. While he says that “[it] looks very much as if drugs work through some [...] of the same pathways that are used in non-drug religious experiences” (p. 129), the discussion of the underlying biology—how this is the case and what those common pathways might be—does not extend beyond the statement that “[most] of the main psychoactive drugs are either analogues of naturally occurring neurotransmitters, or change the levels of naturally occurring neurotransmitters” (p. 120). The trend is similar throughout the rest of the book; while each chapter artfully describes a particular trait of spiritual experience, it leaves unanswered the most pressing question: what actually happens to the brain during sex, seizures, hunger, cold, near-death and out-of-body experiences, for example, and what can that tell us about the biology of spiritual experience?

Charles Foster is obviously a skilled writer and his book is an entertaining and thought-provoking read. It raises a fascinating and deep set of questions relating to

the nature of spiritual experience and forces the reader to ponder what it means that the “corporeal and incorporeal are intimately related” (p. 80). It is therefore disappointing that although Foster’s thesis may very well be true, he neglects to discuss the scientific evidence of how and why it might be true. The promise of the book to address “The Biology of Spiritual Experience” is ultimately unfulfilled. Readers looking for an entertaining overview of the diversity yet commonality of spiritual experiences will thoroughly enjoy this book. Those desiring a discussion of the biology and the neuroscience behind those spiritual experiences had best look elsewhere.

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EINSTEIN, POLANYI AND THE LAWS OF NATURE
by Lydia Jaeger. West Conshohocken, PA: Templeton Press, 2010. 336 pages, index. Paperback; \$59.95. ISBN: 9781599472478.

Let me start this review of Lydia Jaeger’s *Einstein, Polanyi and the Laws of Nature* by seconding her view that “Let us not merely try to understand the extraordinary actions of the Lord, but let us also, and perhaps first and foremost try to think about how he usually acts in his creation” (p. 216). So much of the science and religion literature focuses on miracles and extraordinary interventions without first getting its bearings on how God normally acts in creation. Fixing more attention on God’s normal ways of working in creation is Jaeger’s best idea.

Part 1 of the book focuses on the work of Michael Polanyi. While Jaeger gives a serviceable introduction to his epistemological views for those unfamiliar with them, readers already familiar with Polanyi’s thinking will find nothing new here and can skip to one of the other parts without loss. In Part 2, Jaeger focuses on Albert Einstein. The introduction to Einstein’s thinking on nature, philosophy, and religion is serviceable for anyone unfamiliar with these. Anyone already acquainted with these aspects of Einstein can skip to one of the other parts of the book without loss.

It is Part 3, where Jaeger focuses on the concept of laws of nature in the Bible and science that is potentially the most interesting to PSCF readers. In chapter 1 of Part 3, Jaeger writes that “the Old Testament reveals the duality of its thinking about nature. On the one hand, natural phenomena are tied to rules, to a stable order; on the other, the Lord causes them through *immediate action*” (p. 139, emphasis added). As many biblical and theological scholars have emphasized, God is never pictured in the Bible as doing anything in immediate or unmediated fashion—his acts in creation are always mediated.¹ So Jaeger starts out her analysis by adopting a false dichotomy that has been very dominant in both religious and secular thinking about God and creation since the eighteenth century: Every event in nature either occurs because of God’s unmediated activity or occurs due to natural processes without any influence of God whatsoever. This dichotomy is foreign to the Bible, and places any analyses of divine action and laws of natural and the created order into a

straightjacket. I found Jaeger's discussion of nature, laws, and God's activity in creation in this chapter to basically be reading this dichotomy into the biblical texts (this is what many of her sources do as well). The concept of mediation has been sorely neglected in theology and hermeneutics and offers a way out of the false dichotomy.² Unfortunately, mediated action only gets some glancing mentions in the book (e.g., p. 144). Readers will not find the clarity and insight they seek here.

After a summative discussion of historical sources for the origin and motivation for the modern conception of laws of nature (chapter 2, Part 3), Jaeger's conclusion is that biblical revelation provided necessary conditions for the development of the modern notion of laws. In agreement with sound scholarship on the question, she acknowledges that biblical revelation does not provide sufficient conditions for the modern notion of laws. Moreover, through exploring aspects of philosophy of science as well as developments in relativity theory, quantum mechanics, and chaos (chapter 3, Part 3), Jaeger concludes that biblical usage of "law" is in terms of "everyday language" and "prescientific" as in premodern science (pp. 206–7). Yet, only those who have not read much in the literature discussing the history of science and religion will find new information on laws of nature in Part 3.

The fundamental difficulty with this book is that despite its overwhelming number of footnotes (three chapters have over 78; two more chapters, over 100; and one chapter even has 238!), it reads as if Jaeger is only first coming to terms with the science-religion literature and only has a narrow feel for what has been explored therein. The best way to read this book is to obtain it from the library and only look at the parts that interest you as this is not a book that *PSCF* readers should purchase.

A final warning: This book was originally written in French which, as with many languages, makes clear the distinction between the use of the second person plural to refer to the self—the so-called royal we—and the third person plural to refer to a group of people. Unfortunately, the translation of Jaeger's book collapses these different senses together. The translation did her a disservice by not using "I" whenever she referred to herself, or at least substituting "humans," "people," or some other elocution for "we" whenever Jaeger refers to people in general. Readers will grow tired of constantly having to ask, "Who is the 'we'?" page after page.

Notes

¹For example, C. E. Gunton, *The Triune Creator: A Historical and Systematic Study* (Grand Rapids, MI: Eerdmans, 1998); T. F. Torrance, *The Ground and Grammar of Theology: Consonance between Theology and Science* (1980; reprint, Edinburgh: T&T Clark, 2005); and F. Watson, *Text and Truth: Redefining Biblical Theology* (Edinburgh: T&T Clark, 1997).

²Gunton, *The Triune Creator: A Historical and Systematic Study*; and R. C. Bishop, "Recovering the Doctrine of Creation: A Theological View of Science," *Scholarly Papers*, The BioLogos Foundation (January 31, 2011), <http://biologos.org/projects/scholar-essays>.

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Letters

On the Relevance of the Idea of Complementarity

I should like to thank Christopher Rios for his fascinating historical article on the idea of complementarity in discussions about the relation between science and Christian belief ("Claiming Complementarity," *PSCF* 63, no. 2 [2011]: 75–84). As an octogenarian, I have had the privilege of meeting a number of the protagonists for this idea.

However, as an engineering scientist, I have often wondered whether both scientists and theologians can forget that their specialist disciplines, such as all human knowledge, concern themselves with models of reality. In engineering, such models are constructed by selecting a small number of parameters which are of special importance for the operation of a device or system. These parameters are constructs of the human mind.

Engineers have constantly to remind themselves that their models are not the actual thing. Models can never be a substitute for a full-scale test. Moreover, useful modeling requires many different models of the same object. Thus a thermodynamic model of a gas turbine does not provide information about the price of gas in its effect on the viability of a project. Engineers who ignore economic models go out of business. This does not seem to me to be due to a philosophical principle of complementarity, but to the distinction between necessary and sufficient conditions in the solution of a problem.

A fortiori even the variety of models cannot elucidate the desirability of building a gas power station which depends on its purpose in generating electricity with its social consequences. Although Bohr's principle is undoubtedly important in the context of quantum physics, it may not be relevant to discussions between theology and science. It brings to my mind a comment attributed to Francis Bacon on William Gilbert's book *De Magnete*, "Gilbert has attempted to construct a world using material insufficient for the pins of a rowing boat."

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Biblical Longevities: Some Questions and Issues

Walter Makous, "Biblical Longevities: Empirical Data or Fabricated Numbers?" (*PSCF* 63, no. 2 [2011]: 117–30) presents a novel approach to analyzing Old Testament genealogies. However, his methodology raises a number of significant questions which serve to undermine his conclusions.

Most of these questions arise from his Table 1, a purported listing of all generations from Adam to Manasseh which is used for the longevity plot of Figure 1. In order to be correct, it should contain no duplications or gaps. However, it has both. For instance, ordinals 21 and 22, Ishmael and Isaac, are both sons of Abram, ordinal 20, and thus redundant. Similarly, Aaron and Moses, ordinals