



JUST WATER: Theology, Ethics, and the Global Water Crisis by Christiana Peppard. Maryknoll, NY: Orbis Books, 2014. 230 pages, notes. Paperback; \$28.00. ISBN: 9781626980563.

According to Christian Peppard, *Just Water* seeks to inform readers of the significance of fresh water in an era of economic globalization, providing an ethical analysis and recommendations regarding water use and scarcity within the backdrop of Catholic social thought. The book is directed at “educated nonspecialists.”

Just Water starts with chapters serving as a primer for understanding the relationship between twenty-first-century theology and ethics followed by a primer on the global freshwater crisis.

In chapter one, Peppard suggests that the growth of human knowledge, diversity in culture, deeper understanding of race and gender, and better understanding of power structures have shaped theological thinking in the twenty-first century. The second chapter describes the reasons why our rates of use and the types of fresh water available to us are creating a worldwide scarcity. The third chapter lays out arguments for water as a human right and not an economic commodity, and the fourth chapter provides insight into Catholic social thinking while posing the question as to whether access to clean water is a right-to-life issue. The remaining chapters of the book describe some of the contextual issues that relate to water scarcity: agricultural practices (that account for 90% of fresh water consumption), climate change and its impact on global water, and hydraulic fracturing. Interposed among these chapters are two chapters connecting water to faith. These chapters explore the question of what Jesus had to do with water, through a historical and hydrological examination of the key river of the Bible, the Jordan, and exploration of the New Testament story of Jesus’s interaction with the Samaritan woman at the well.

I believe that water scarcity is the most serious problem of the twenty-first century. Water cannot be conceived of in isolation of human activities. There is a connection between water and food, energy, security, war, climate change, law, and if you allow, even beer production. (A recent article in the *Chicago Tribune* described the water nexus with brewing: It can take up to 20 gallons of water to make a single pint of beer and, with water in scarce supply, more than one-quarter of beverage production is in jeopardy.)

I wish Peppard had made a stronger case for water being a human right rather than a commodity. Although her examples of the bottled water industry and the Bolivian “water war” are interesting, and the fact that the Vatican and United Nations have declared water a human right, I do not believe that there is either consensus or understanding of the issues by the “educated nonspecialist.” I would have liked to have seen her do more to secure her argument on the side of human rights.

All countries need energy. Some countries are blessed (a mixed blessing at best) with the natural resources that allow them to be exporters of energy, usually with significant financial returns to that country. Others have to purchase the energy, making them dependent on whatever country is providing that energy. Most countries want energy independence (read, energy security). Energy production and transportation is messy at best. Usually, energy production is harmful to the environment, risky, and always has a water price tag. Peppard chose to describe the hydraulic fracturing process as an example of energy extraction that may have significant impact on the water scarcity issue. Fracking is an extraction process that is being used in many countries in the world. Many countries have banned this process because of the serious environmental impacts. Others are going forward, in spite of the inherent risks and one has to ask the why question.

The chapter entitled, “The Jordan River,” starts with a quote from theologian Denis Edwards.

The number of Christians who are deeply committed to ecology find it easy enough to see their commitment in relation to God as Creator, but they cannot see a connection with the story of Jesus. (The) urgent task for theology is to show the interconnection between living memory of Jesus and the issues that confront the global community. Only when this connection is made will ecological action be seen not only as ethically responsible but also radically Christian.

Peppard asks the question: what does water have to do with Jesus? I was drawn to this chapter because I wanted to understand the Jesus connection. However, being baptized in a river that is now polluted and even questionably a present-day stream, or using this river as an example of holy waters, or inferring that the degradation of the river should be of particular concern to Christians did not help me form a linkage between Jesus and ecology. A recent *National Geographic* article by Peter Schwartzstein asked the question: “Biblical Waters: Can the Jordan River Be Saved?” It described how, with the swelling ranks of Syrian refugees in Jordan, the over-

Book Reviews

stressed Jordan River is at risk of going dry. Further, very little water is drawn from the Lower Jordan, which is pitifully small by the time Syria, Israel, and Jordan have dirtied and drained it of 96 percent of its water. Environmentalists see water issues in the Middle East and along the Jordan River in particular as emblematic of a wider inability to crack the Israeli-Palestinian conflict. I wish the Jesus connection were more evident for me in Peppard's book.

Peppard's book points toward a renewed vision for environmental ethics and ecological theology, but falls short in developing it. This vision is important for politicians, scientists, economists, and others working in the real world. They are seeking sound ethical guidance in their work and on the recommendations they make. She has made a start with *Just Water*. I look forward to seeing where she can go in her future writings.

There were words in this book I just did not understand in the context in which they were used. It made for difficult reading at times. In her acknowledgments, Peppard states that a number of chapters in *Just Water* are adapted from articles she wrote or online media contributions. I felt the book read as such. Several chapters could have used more development, and I had difficulty seeing connections between chapters.

The message that Peppard wishes to convey is too important not to speak to us all. As James Famiglietti of the University of Southern California said about the global water crisis:

We have a crisis of understanding: does the public and do our elected officials really understand what's happening with water, nationally and globally? If they did, I contend that we could make some real progress towards managing this crisis. I made the point that hydrologists like myself have a clear mission "to help elevate awareness of critical water issues to the level of everyday understanding."

Reviewed by John Mickus, Professor Emeritus, Benedictine University, Lisle, IL 60532.



GENERAL SCIENCES

THE WHY OF THINGS: Causality in Science, Medicine, and Life by Peter Rabins. New York: Columbia University Press, 2013. 253 pages. Hardcover; \$28.95. ISBN: 9780231164726.

Philosophers have wrestled with the concept of causation at least since Aristotle; *The Why of Things* presents a fresh analysis. Peter Rabins is a psychiatrist;

nevertheless, he undertakes a broad, interdisciplinary analysis of how causation can be inferred. He succeeds, although his examples are more nuanced and effective in areas close to medicine.

Rabins acknowledges that "cause" does not enjoy a univocal definition, that understandings of causation have varied across time and cultures, and that one cannot prove causality. Nevertheless, he begins with the premise that "causes exist and causal relationships can be discovered and confirmed" if not proven. His analysis is multifaceted, built around the metaphor of a tetrahedron with each of the visible faces representing a different aspect of causality. Facet 1 consists of *conceptual models* of causal logic: the categorical (something is a cause or it is not), the probabilistic (causes that predispose a possible outcome), and the emergent (as found in self-organizing systems). Facet 2 describes four *levels of analysis*: predisposing, precipitating, programmatic, and purposive; these are not simply a reformulation of Aristotle's four causes (material, formal, efficient, and final) although they bear a resemblance. Facet 3 describes three *logics* (i.e., methods) by which causal knowledge is obtained: empirical, empathic, and ecclesiastic.

Rabins follows this sketch of his model of causation with a well-written historical overview, walking the reader through Aristotle's analysis of causation; the narrowing of the concept during the scientific revolution in response to Galileo's critique of Aristotle; the philosophical analyses of Mill, Hume, and Kant; the social science perspectives of Weber and Jaspers; and the twentieth-century impacts of quantum mechanics and mathematical undecidability. He concludes with a critique of Popper's falsifiability notion, which he regards as overly restrictive for causal inference.

Rabin then turns to the three conceptual models, devoting a chapter to each. He analyzes the strengths of the categorical model (simplicity, ease of producing observable results, seeming cognitive innateness) and its limitations (there are typically many complex and interconnected causes and it requires choosing a level of analysis). He discusses the standard criteria for inferring categorical causation—for A to be a cause of B, A and B must be sequential, ordered temporally, in a relationship that occurs with regularity, and the inference must be plausible. He rejects the assertion that causation is merely a social construct, but acknowledges that a claim of causation requires an unprovable belief that causation exists and that causal inferences are partially subjective due to the plausibility criterion. He then turns to probabilistic causation defining it as "events that affect the likelihood another event will occur."

Once again he addresses strengths and limitations, notably that probabilistic causation does not seem to be a universal characteristic of human reasoning; nevertheless, it seems a better tool for dealing with multiple, interacting causes, an assertion backed up by several examples. The choice between categorical and probabilistic causation, Rabins suggests, is simply utility in a situation. The chapter on emergent causation is largely an explanation of the concept of self-organizing systems—these constitute a different type of causation because properties emerge in such systems that cannot be inferred from their individual components.

The account of facet 1 (the three conceptual models) was thorough and carefully organized. Rabin does not offer separate sections on facet 2; rather, he integrates discussion of them into several chapters organized around facet 3 and the case studies with which he concludes. I think the book would have been stronger had he devoted a chapter to discussing the four levels of facet 2; nevertheless, he does a reasonable job, clarifying the levels as he proceeds.

Rabin begins his discussion of the logics by which causal knowledge is obtained with a general discussion of empirical methods in physical science. He argues from relativity theory, quantum mechanics, and Gödel's incompleteness theorem to the existence of limitations on human ability to obtain causal knowledge. The limitations can be partially surmounted, however; he uses plate tectonics as a case study of how consensus on a causal model has developed in physical science in spite of the limitations. He then presents a more detailed analysis of empirical methods, drawing on his knowledge of biology and epidemiology. He does quite a nice job presenting the historical development and rationale for randomized clinical trials and includes a clear, intuitive discussion of the statistical techniques involved; he also explains other approaches such as convergent validity and counterfactual techniques used to investigate causality in situations in which randomized control trials (RCTs) are not possible.

He then contrasts the approach to causal inference, typically used in the study of history combined with the study of natural science. His discussion of the empathic or narrative method as used by historians is insightful, as it avoids the simplistic cliché that science is objective and history is subjective while respectfully treating the differences in their methods and subject matter. For instance, he writes,

Scientists seek a comprehensive understanding of the natural order that exists whether or not they are studying it. Historians seek a comprehensive

understanding of events by dint of the individual's ability to link together convincingly what is known.

He explicitly rejects the notion that the study of history is so dependent on the perspective of the observer that it lacks usefulness; rather, he sees this limitation as another form of human inability to obtain absolute knowledge. He explains the narrative method clearly, asserting that its main advantage "is its ability to increase our understanding of unique past and present events." He illustrates his account with three case studies—holocaust denial, the Wright brothers' invention of the airplane, and Alexis de Tocqueville's *Democracy in America*.

Rabin turns next to "cause in the ecclesiastic tradition." He uses a single definition for religion and spirituality: "overarching beliefs that explain such basic questions as the origin, purpose, and proper form of life." His use of the word "ecclesiastic" emphasizes that these characteristics are shared among groups of individuals, are relatively stable over time, and are based in *given* truth. He emphasizes that the logic of causal analysis in religion is the opposite of the logic of the empirical and empathic methods—rather than seeking universals, the ecclesiastic method "begins with the knowledge of what they are." As a result, ecclesiastic systems place a major emphasis on "why" questions and purposes and on prescribing how people should live; he also notes that the ecclesiastic approach involves a much stronger emotional component than the other two approaches, although these distinctions are not absolute. This foundational analysis is helpful but the structures he builds on it—comparing the ecclesiastic method with the empiric and empathic, and briefly reviewing causality as found in both Hinduism and the Abrahamic religions—are lightweight. For instance, in comparing the empiric and ecclesiastic approaches, he settles on the nonoverlapping magisteria perspective most closely associated with Stephen Jay Gould. While respectful of both approaches, it ignores the fact that, in some situations, the magisteria do overlap. Also, he does not address primary and secondary causation or any of the literature on the nature of divine providence.

Rabin concludes with six case studies to which he applies his causal analysis: the emergence of HIV/AIDS as a worldwide epidemic disease, evolution as a causal concept, causality in US law, Alzheimer's disease, human aggression, and the etiology of depression. These are nicely done and effectively illustrate his four levels of analysis.

Even though the ecclesiastical section is lightweight, overall I found this book to be the best analysis of

Book Reviews

causal inference that I have encountered. Its scope is broad. It is well organized and highly readable. It addresses the main issues carefully. I give it an A and highly recommend it.

Reviewed by James Bradley, Emeritus Professor of Mathematics, Calvin College, Grand Rapids, MI 49546.



HISTORY OF SCIENCE

TRYING BIOLOGY: The Scopes Trial, Textbooks, and the Antievolution Movement in American Schools by Adam R. Shapiro. Chicago, IL: University of Chicago Press, 2013. 193 pages including notes and index. Hardcover; \$35.00. ISBN: 9780226029450.

With its dramatic events, rich symbolism, and memorable cast of characters, the Scopes Trial of 1925 is remembered as a landmark in the twentieth-century encounter between Christianity and science. In the nearly nine decades that have passed, this “trial of the century” has received no small amount of amateur and scholarly attention, including the 1960 Hollywood film *Inherit the Wind* and Edward J. Larson’s Pulitzer Prize-winning *Summer for the Gods* (Harvard University Press, 1997). Just when it might seem to be losing its fruitfulness for new historical inquiry, Adam R. Shapiro offers a fresh perspective that reveals an even deeper drama, a renewed symbolism, and an enlarged cast. *Trying Biology* is a persuasively argued account of the role the textbook industry played in the antievolution movement of the interwar period. It explores how the conflict personified by William Jennings Bryan and Clarence Darrow was about more than fundamentalist opposition to evolution and a threatening biology curriculum; it was also part of a widespread backlash against an expansion and standardization of compulsory secondary education that used science to promote a particular view of citizenship and social progress.

Shapiro is a lecturer in intellectual and cultural history at Birkbeck, University of London, specializing in the history of science, religion, and education in American culture. His previous publications include “The Scopes Trial beyond Science and Religion,” in *Science and Religion: New Historical Perspectives* (Cambridge, 2010).

The six central chapters of *Trying Biology* are structured around four themes. Chapters two and three examine the textbook business from the late nineteenth century until the 1920s. Describing an industry comparable to those of steel, oil, and gas, these chapters uncover how textbooks were written, published,

and marketed; how politics and corporate maneuvering, rather than content, determined sales; and how these factors contributed to the events that eventually led to the trial. Shapiro pays particular attention to the development of statewide adoption of textbooks and highlights the irony of how Tennessee’s use of George William Hunter’s *Civic Biology* made the trial possible because the state-adopted text contained the state-prohibited ideas.

Chapter four focuses on the way *Civic Biology* represented a new way of thinking about biology as a discipline and about science’s potential role in education. Previously, the study of life was divided between botany and zoology. Hunter’s holistic approach, coupled with a strong social Darwinian, progressivist ethos, offered not just a new view of the subject but also a way to understand the nature, practice, and potential of science education for shaping students’ minds. As Hunter’s title suggests, biology had the ability to serve as the centerpiece for educating students for an urban, democratic society. Such a book may have affirmed attitudes in America’s rapidly growing cities, but for those in the rural South, its statewide adoption, timed with the expansion of compulsory education beyond urban centers, signaled a threat to deeply held beliefs. According to Shapiro, it was the response to these issues, rather than religion that offered the primary motivation for school antievolutionism.

Chapter five shifts focus from textbooks to the trial in order to explore “how Scopes was framed,” as the title puts it. Shapiro distinguishes between *Tennessee v. John Scopes*, the legal case, and the “Scopes Trial,” the public spectacle that pitted science and freedom against Christianity and the Bible. For all involved, including the defense, the outcome of the former was never in doubt. Scopes’s guilt was a foregone conclusion. (Indeed it was the ruling desired by the ACLU, the organization that orchestrated the trial.) It was the outcome of the latter, by contrast, that dominated public attention, and in doing so defined the debate. As a result, the participants arguing for harmony between creation and evolution were overshadowed by those with a narrow understanding of the Bible and Christianity that insisted upon conflict. Shapiro rightly points out that if Scopes’s actions and the meaning of the law had been addressed, he may have been acquitted. But there were broader issues at stake that both the prosecution and defense were eager to expose.

The final chapters consider the effect the Scopes Trial had on textbook authors and publishers. In one sense, the trial should have had no effect; the law only regulated teachers. Still, no company wanted

to jeopardize sales over controversial content. Many within the industry thus assumed changes were in order, but the changes that came about were largely ambiguous and superficial, merely striking the word “evolution” from the text or removing an offensive illustration without changing the content, as was done for Hunter’s *New Civic Biology*. The principles of evolution were still included, only without the labels. Thus the real effect of the trial had almost nothing to do with the way textbooks were written and nearly everything to do with the way they were read and taught. As long as the word itself was avoided, neither the book nor the teacher could be accused of promoting evolution. According to Shapiro, this had an unfortunate (and ironic) effect on American science education: a return to rote teaching where a literal interpretation of the textbook was encouraged to the detriment of rigorous engagement with the text and its meaning.

On the whole, Shapiro has provided an excellent new analysis and welcome contribution to the field. Readers of *PSCF* will probably be most interested in the second half of the book, but the exploration of the textbook industry should not be skipped. Readers may also question a few minor points in his argument, such as the extent to which he distinguishes religion from other social and cultural factors that prompted the Southern objection to evolution in the schools. Yet overall this book offers valuable insight into one of the defining events of the twentieth century.

Reviewed by Christopher M. Rios, Assistant Dean for Graduate Studies, Baylor University, Waco, TX 76798.

CURIOSITY: How Science Became Interested in Everything by Philip Ball. Chicago, IL: University of Chicago Press, 2013. 452 pages. Hardcover; \$35.00. ISBN: 9780226045795.

The book *Curiosity* by Philip Ball is certainly a stimulating romp through the beginnings of science in the early modern period, whatever else it is. The book is primarily about the development of science in the late sixteenth and the seventeenth centuries, but it is much more than that. It is a book about the cultures of the time, and the rich interplay between the kind of thinking that ultimately led to modern science and the ways of thinking that took place in those days, which in many ways were decidedly different from what we might expect of “scientific men.”

As Ball recounts, the usual narrative concerning progress in this period centers on the so-called scientific method as a key innovation (p. 4). He offers

instead (whence the book receives its title) that perhaps tracking the notion of the changing meaning of *curiosity* might better account for the developments toward modern science. As he tells the story, for the ancient Greeks the meaning was not clearly articulated, but it was nevertheless represented to be the cause of the ills of the world in relation to Pandora’s Box (p. 10). Based on the account of the Fall and some historical references, early Christians are supposed to have thought of curiosity as a danger.

Fast-forward to the late medieval period: this curiosity expresses itself in the “allure of secrets” (p. 32). With this backdrop, Francis Bacon referred to a knowledge of the “web of secrets” of nature and is famously known for saying that “knowledge is power.” In ensuing chapters, we read of a surprising array of curiosity seekers with their “cabinets of curiosities” (p. 53) and the formation of secret societies for exchanging knowledge of the secrets of nature. Just to give one example, Giambattista della Porta, founder of the Accademia dei Segreti in Naples, in 1558 wrote a book *Natural Magick*, in which he portrayed magic as “nothing else but the knowledge of the whole course of Nature” (p. 42). Della Porta was also known for his own collection of curiosities which contained “plants and botanical specimens, gems, stones and all manner of things and unusual” (p. 53). Inspired by della Porta’s book, the still-teenage Duke of Umbria, Federico Cesi, founded his own society called the Academy of Lynxes (Accademia dei Lincei), motivated by a statement in della Porta’s book: “examine with lynx-like eyes those things which manifest themselves” (p. 64). This Cesi, who ultimately became della Porta’s benefactor, is the same Cesi who supported Galileo in his publishing and with his difficulties with the church.

In another example, which shows how these cabinets of curiosity move to museum status and finally to set the stage for the modern museums we have today, we see the collection of John Tradescant, which contained a vast collection of items from all over the world. Just to name a few of the things mentioned to be in the collection there were

a pelican, a remora, a *lanhado* from Africa ..., a flying squirrel, another squirrel like a fish, all kinds of brightly colored birds from India ..., an ape’s head, ..., the hand of a mermaid, the hand of a mummy ..., a small piece of wood from the cross of Christ ..., a girdle such as the Turks wear in Jerusalem ..., a scourge with which Charles V [the Holy Roman Emperor] is said to have scourged himself, a hat band of snake bones. (pp. 158–9)

This collection was opened to the public for a door fee. When Tradescant died, the collection passed to

Book Reviews

his son, whom Elias Ashmole convinced to deed the collection to himself upon the son's own passing, a promise the son later regretted but could not reverse (p. 160). Ashmole in turn ultimately donated the collection to the University of Oxford where it eventually became the Ashmolean Museum. Was I surprised to find out that this famous Museum had its roots in trickery, in order to gain the collection!

Fast-forward again to the seventeenth century, and we see well-known figures such as Johannes Kepler as men between worlds. Rather than a person who thinks as modern scientists do, we find Kepler continuing to try to fit his elliptical orbits into a model motivated by the five Platonic solids as explanation for the planetary spacing (p. 198). That he never abandoned this earlier model was certainly news to me, but it does show Kepler as a man of his times. He, like most others of his time, also dabbled in astrology, which is not the usual conception we would have of one of the scientists who ushered in the age of modern science. Galileo, having heard through Cesi of Kepler's finding that the planets orbit in ellipses, refused to accept this suggestion, since it was too far afield from his view of the mathematical cosmos (p. 196). And so even Galileo and Newton do not escape the charge that they were thinking more like the ancients than a modern in their approach to experiment. It was said that they were not so much motivated "from curiosity to discover how nature behaves as a desire to verify prior hypotheses" (p. 209). That is to say, that from the point of view of modern eyes, these times were a "perplexing mix of the new and the old, of the seemingly occult and the 'modern,' the enchanted and the rational."

Later, with the increasing use of scientific instruments, the importance of this progress and its influence on those who begin to experience new phenomena becomes clearer. Perhaps my favorite part of the book was the section that describes the growth of the Royal Society in England, first as competing societies between London and Oxford, but then as a rich interplay between the likes of Robert Boyle, Robert Hooke, and Christopher Wren. In accounts of the use of the microscope, and the development of the vacuum chamber, these men really came alive as flesh and blood individuals with passions, and not simply idols of history. There is also a fair amount of political involvement mentioned, in order to set the historical stage. The accounting is not entirely linear in relation to a historical timeline. For example, after discussing the microscope, Ball opens a new chapter in which he revisits some of the same time periods,

but focusing on a different subject, the development of an understanding of light and the description of the rainbow. Here we see in full force the apparent feud between Robert Hooke and Isaac Newton, to the extent that Newton withdrew his membership from the Royal Society and refused to publish his book on optics until Hooke had died (p. 338). The next chapter brings us the news that the activities of members of the Royal Society were not altogether appreciated. Indeed, in the form of a play, *The Virtuoso*, by Thomas Shadwell, the activities of the Royal Society are openly criticized as being useless and impractical, and the main point of focus was Hooke himself (p. 354). This attitude seems to be fairly commonly shared at the time, though Ball comments that with hindsight we see how myopic this view was.

There is much more in this book than I have outlined above but I hope I have given a suggestive spirit as to how the book is written. Now I would like to say a few words about the relation of this book to the Christian milieu in which it takes place. Though Ball is not writing from a Christian perspective per se, there are many references to God and to the church and other Christian doctrines. For example, in the earlier chapters it is evident that there was a tacit assumption of the veracity of the Scriptures, and an acceptance of such doctrines as the creation story of Adam and Eve, and the Fall of man. In later chapters, there are references to the pious attitudes and responses to their discoveries from men such as Robert Boyle and Robert Hooke. While these are reported in passing, as I think any good historian would do, it is possible that some emphases by the author might be somewhat altered had he approached them from a more focused Christian perspective. Nevertheless there are many indicators of the role of religion in general and Christianity in particular, so those looking for some input into the science and religion discussion will find helpful insights here.

Whether Ball actually accomplished the goal of portraying a major role for shifting notions of curiosity, it certainly did well as a running theme. Some further criticism might be that the book was somewhat unpredictable in its organization. What would the next chapter be about? And why was it included in this order? Nevertheless, the book is a fascinating one and a delight to read, and anyone who would like to gain a richer understanding of this period in relation to the development of science would enjoy the read.

Reviewed by Don Petcher, Department of Physics, Covenant College, Lookout Mountain, GA 30750.



ORIGINS & COSMOLOGY

NEANDERTHAL MAN: In Search of Lost Genomes
by Svante Pääbo. New York: Basic Books, 2014.
275 pages. Hardcover; \$21.00. ISBN: 0465020836.

What makes humans unique? This question has driven Svante Pääbo for most of his scientific career. In his new book, he recounts the story of his work sequencing genomes of long-dead organisms. His quest toward uncovering ancient genomes began in secret in 1984, when as a graduate student he conducted covert experiments on beef liver during nights and weekends to protect himself from ridicule. It culminated in 2011 with international recognition and two publications presenting the complete sequence of Neanderthal and Denisovan genomes. The technical advances required in the intervening years came from disciplined and detailed work on the part of Pääbo and his team, and developments in molecular biology and genomics generally. The project was possible because of the global community of scientists the author recruited to his Neanderthal Genome Consortium. The book reveals examples of his disciplined work (many years' worth of wash steps from DNA preparations that were stored in a freezer became a massive stockpile of ancient DNA when techniques were improved), advances in the field (his first presentation of ancient DNA work was in a session where future Nobel laureate Kary Mullis described PCR), and the contributions of his global team (key leaders on the project came from three continents and a dozen countries).

The book is an autobiography that reads like a scientific mystery novel. In his story, each career move, collaboration, technological breakthrough, and seminal paper brings him another step closer to answering his driving question. The book provides enough technical explanation to permit those outside of genomics or archeology to follow along without slowing down the action with unnecessary lectures. Those seeking a more detailed understanding of his work will appreciate the references to his relevant papers throughout the text.

For Christians who embrace a theistic evolutionary understanding of human origins, the book is an interesting read about the hard work needed to produce groundbreaking science. For those who believe in recent, special creation of modern humans, however, the author's work may be troubling due to the overwhelming genetic similarities shown between Neanderthals, Denisovans, and modern humans.

Additionally, the book provides strong evidence of gene flow between modern humans and both Neanderthals and Denisovans. These data support the complex history and messy speciation that best explains the rise of humans as we exist today. The work supports the hypothesis that modern humans evolved in Africa and then spread from there into the wider world. In their travels, our ancestors encountered other archaic humans like Neanderthals and Denisovans. While some of these encounters may have been violent, explaining the extinction of both species after contact with modern humans, others produced offspring that were raised by modern humans and incorporated, genetically, into the population. These other humans may be gone, but humans today still carry some of their genes. In the hands of Pääbo and his team, each of us becomes a living fossil.

One weakness of the book is the author's periodic references to his own, colorful sexual history. The stories are not numerous, but they do serve as a distraction from the overall arc of the book. These intrusions are ironic considering the author's assertion that, "To me, 'who had sex with whom' in the Late Pleistocene is a question of secondary importance. What matters is that Neanderthals did in fact contribute genes to people today." Likewise, those of us interested in the contribution of Neanderthals to our own genome may not be interested in who had sex with whom among elite scientists. More distractions come from his initial descriptions of his collaborators and competitors. He is frank to the point of critical, even of people with whom he worked closely for years. Some of his descriptions are even quite comical. For example, he says of Jim Mullikin, former head of the National Human Genome Research Institute, "He somehow reminded me of Winnie the Pooh, but a very, very competent version of the friendly bear."

Considering that this book is written by a world-renowned scientist who is a native Swede and works in Germany, it is very easy to read. For those with questions about human origins and speciation, this book provides many answers. For anyone interested in what is required to perform science at the very highest level, Pääbo's story can serve as a useful guide. His achievement required unflinching commitment, remarkable timing, and a dedicated team. With *Neanderthal Man* we are able to appreciate his commitment, timing, and team in a way that goes far beyond what can be seen in his award-winning papers.

Reviewed by Clayton Carlson, Assistant Professor of Biology, Trinity Christian College, Palos Heights, IL 60445.

Book Reviews

DEATH BEFORE THE FALL: Biblical Literalism and the Problem of Animal Suffering by Ronald E. Osborn. Downers Grove, IL: IVP Academic, 2014. 195 pages, endnotes, index. Paperback; \$27.39. ISBN: 9780830840465.

Ronald E. Osborn's *Death Before the Fall: Biblical Literalism and the Problem of Animal Suffering* is an interesting and, one hopes, a helpful addition to the ongoing conversation about the question of human and cosmic origins in Christian circles. Osborn's particular contribution to the conversation involves his exploration of the moral problem of animal predation and suffering in light of what he calls "literalistic" readings of Genesis 1 (pp. 17–19). Another interesting angle here is the author's background in the Seventh-Day Adventist movement. Osborn quite consciously presents this work as an "open letter" to fellow Adventists struggling with questions of the tensions between Genesis and evolutionary science (p. 18). One consequence of this is that Osborn's conversation partners are often very conservative voices from within the Adventist church, and yet readers from other conservative, evangelical traditions will still find most of this book to be accessible and applicable.

Osborn himself admits that he is not a trained biblical scholar or theologian, but refers to himself as a "lay theologian" wrestling with the issues at hand (p. 39). That said, the author holds the PhD from the University of Southern California, with a particular specialization in the thought of Nietzsche, Marx, and Darwin. He is, consequently, a trained philosopher and an excellent thinker, both of which are obvious throughout the book.

There are certainly moments where Osborn's lack of biblical training is obvious to the specialist, particularly in his reading of Genesis 1 in chapter 2 of *Death Before the Fall*. There is nothing really objectionable about Osborn's reading of Genesis, but he spends what seems to be an inordinate amount of time establishing concepts which are taken for granted by biblical scholars (e.g., the meaning of *tob*, or "day"), and he occasionally imposes foreign categories upon the biblical text (e.g., a distinction between "very good" and "perfect"). Still, he does depend on excellent work by others (e.g., Stott and Walton) and his overall reading is quite acceptable.

The book is laid out in two major parts. Part 1 deals with what Osborn refers to as "biblical literalism." He uses this phrase in distinction from "literal" reading. The former indicates an approach that demands the "scientific and historical harmony (or 'concord') of the primeval stories (Genesis 1–11) as defined by

contemporary notions of scientific and historical objectivity, regardless of the actual weight of scientific and historical evidence" (p. 40). The latter refers to a "plain sense" reading of a given text, and may include symbolic or metaphorical interpretations (p. 25). Chapters 2–9 deal extensively with the problem of literalism, where Osborn argues that this type of approach to the Bible is not intrinsically Christian so much as it is intrinsically Modernist. He suggests that literalism is simply a form of philosophical foundationalism, and is thus little more than the mirror image to ideologies like radical atheisms (pp. 46, 58).

This portion of Osborn's work covers no truly new ground, but it is a very helpful overview of the epistemological questions at hand in a discussion of the relationship between the Bible and human origins. An element of particular note is the time, care, and attention Osborn gives to presenting accurate representations of various versions of literalism or creation "science" (e.g., his attempt to find the original source for a famous James Barr quote, pp. 50–1). This is, in fact, one of the most laudable elements of the work as a whole. There is a great deal of invective and vitriol on both sides of this particular debate, and Osborn tries very hard (with mostly good results) to give an honest examination to even ideas he clearly finds absurd. Others writing in this field would do well to note and emulate Osborn's irenic spirit.

This first section includes the aforementioned equation of literalism with foundationalism (chaps. 2–3); a helpful overview of certain elements of the philosophy of science, with a particular emphasis on the work of Kuhn and Lakatos that identifies creation "science" as a degenerating line of inquiry (chap. 4); an extended theological argument against literalism (chap. 5); a sociological and psychological exploration of the "enclave mentality" of literalism, focusing especially on its exclusivism and on its dismissal of all competing theories or readings a priori (chap. 6); an argument that creationism is a kind of Gnosticism (chap. 7); an overview of four historic scholars/theologians whose interpretations of Genesis 1 do not fit the literalistic mould, including Barth, Calvin, Maimonides, and Augustine (chap. 8); and, finally, a positive epistemological argument in favor of a critical realism over and against the naive realism of foundationalist epistemologies (chap. 9).

Part 2 moves into Osborn's more novel argument, which is an exploration of animal predation and suffering as a moral and theological problem. The basic problem involves the question of how, apart from evolutionary processes, the violence and predation of the animal world came about, and what moral

implications the conclusions on this issue might have. In chapter 10, Osborn explores three theories that he has encountered from biblical literalists, all of which begin with the initial presupposition that predation and violence were not features of creation, but were consequences of the Fall into sin. In each case predation is a negative outcome of human sin. But, Osborn argues, this creates an intractable moral problem as it implies that by condemning all of creation along with human beings, God is responsible for causing the suffering of an entire world full of morally innocent creatures.

Osborn himself suggests instead that violence and predation are design-features of creation, constructing his argument especially from Job 38–40 (pp. 152–6). By bringing the book of Job into the argument, Osborn takes the larger canonical witness seriously, and provides a helpful counterpoint to naive readings of Genesis 1–2. But Osborn does not want to leave the conversation with a simple acceptance of predation and violence as intrinsic to God’s creative purposes. He still confesses discomfort with the notion of much of the suffering and death that is “natural” to the created order (p. 157). He also wishes to take seriously the New Testament teaching that “death is the final enemy” (p. 158).

Osborn’s solution? “The destiny of humankind is not simply a recapitulation or recurrence, paradise lost, paradise restored. Rather, the end is greater than the beginning—and was always meant to be so through the mystery of the incarnation” (p. 159). Thus the incarnation of Christ brings about the beginnings of the radical redemption of all of creation, and is consistent with its eternal telos. Osborn suggests that predation and animal suffering are elements of original creative design, but that “creation was never a static golden age but [is] always an unfolding story with an eschatological horizon” (p. 159). That is to say, creation is process, and always was. This also necessarily involves what he calls “a high premium on creaturely freedom,” and is thus consistent with free-will theisms, but may be very difficult to fit into the mould of classical theisms. As an aside, I see here an unacknowledged tension between Osborn’s key biblical text, the book of Job, and his focus on creaturely freedom, given that the book of Job focuses heavily on divine sovereignty.

Osborn’s final chapter explores the ethical outworkings of his preceding theology. This involves taking seriously the human responsibility to care for creation, and to behave ethically toward animals. Osborn also argues strongly for the rediscovery of the vital practice of Sabbath, in all its sacramental

richness (here he shows his Adventist roots again). Both human beings and the land are to be offered Sabbath, which suggests an ethic of care and rest for the human person, as well as care and generosity toward the rest of God’s creation (land, animals). Here again Osborn’s work takes the form not only of a critique of “scientific” creationism per se, but of modernism more generally, equating the indifference toward the earth and the animal world that is all too common among Christians to Nietzsche’s reprehensible ethic of the *Übermenschen*.

The book as a whole is a valuable resource. It is well argued throughout, generous in spirit, and, at times, interestingly eclectic in the voices it engages. Osborn’s tone is perhaps somewhat uneven. At times, he writes in a highly accessible way, which appears to be consistent with his chosen audience. At other times, however, his arguments presume a relatively high degree of familiarity with philosophical discourse—perhaps enough so that some lay readers may find certain chapters difficult to access. That said, Osborn tackles a difficult topic with kindness and respect, and provides yet another compelling case for the consideration of theistic evolution as a legitimate possibility for conservative Christians. I would happily recommend this book to interested laypeople, to academics working in the social or natural sciences who are looking for a theological engagement with the question of human origins, and to theologians and Christian ethicists engaging the question of animal death and suffering.

Reviewed by Colin M. Toffelmire, PhD, Ambrose University College, Calgary, AB T3H 0L5.

RELIGION & SCIENCE

THE OUTER LIMITS OF REASON: What Science, Mathematics, and Logic Cannot Tell Us by Noson S. Yanofsky. Cambridge, MA: MIT Press, 2013. 424 pages. Hardcover; \$29.95. ISBN: 9780262019354.

“Who knows the mind of the LORD? Who is able to give him advice?” (1 Corinthians 2:16).

This is a popular-level science book in the publishing niche of classics such as Hofstadter’s *Gödel, Escher, Bach*, or Penrose’s *The Emperor’s New Mind*. It is an exploration of the limits of reason. What can reason tell us about the limits of reason? A fascinating read that goes against the grain in choosing to explore what science, mathematics, and reason tell us cannot be revealed, rather than what they have or have not yet fully explained. As the author (a computer scientist from Brooklyn College) advocates, in many

Book Reviews

ways that which we cannot reach is more intriguing; why are there limits to what we can know? Why cannot reason take us beyond those limits? Essentially the book is a gathering together of recent (~ the last 100 years) results in physics, mathematics, and computing science that shed light on the scientific limitations of reason: if you will, an updating of traditional philosophical thinking on epistemology.

Firstly, the book is well written and thoughtfully put together. Explanations are accessible to the non-expert; this shines through particularly in the discussions on quantum mechanics, which were the best I have read. It's an engaging read, covering subjects in depth, while remaining lighthearted and often witty. Diagrams and figures are used effectively to aid understanding. Mathematical equations are virtually absent as the author confesses to following the publishing adage that "every equation reduces the readership by half." Each chapter ends with further reading suggestions; footnotes are used effectively pointing to references, deeper explanations, and interesting side comments.

Individual chapters are essentially self-contained, addressing the central issue from different points of view, so we have nine chapters covering such diverse topics as language, philosophy, physics, mathematics, computing science, and metaphysics. Each of the chapters contains a treasure chest of known paradoxes and limitations. Examples include the liar paradox, Zeno's paradoxes, the travelling salesman problem, Turing's halting problem, Gödel's incompleteness theorem, and Schrödinger's cat. Usually these types of puzzles put my head in a spin, leaving me unsatisfied by the resulting intractability. However, I did not find that to be the case in this book; the author adeptly steers the reader on a route through many of these limitations without diminishing one's appreciation of the world we inhabit. Yanofsky unpacks these limitations, putting them in context and helping to uncover why these boundaries of reason arise.

The tenth and final chapter seeks to gather these separate chapters together to build a collective picture. Certain themes emerge. Of utmost importance is that of the common occurrence of self-referential systems: for example, "I am lying," the set that contains all sets that don't contain themselves, and even the universe that observes itself. Another theme is distinguishing between what is describable and what is indescribable. The author explains that by "... the very nature of language, what can be described is countably infinite. In contrast, what actually exists 'out there' is uncountably infinite" (p. 345). Yanofsky further adds:

This is stated without proof because I cannot quantify all phenomena. To quantify them, I would have to describe them and I cannot do that without language. So there might be an uncountably infinite number of phenomena and only a small, countably infinite subset describable by science. This is the ultimate, nonscientific (science must stay within the bounds of language) limitation on science's ability. (p. 175)

What we know is a drop, what we don't know is an ocean. (Isaac Newton, quoted by Yanofsky, p. 345)

The book does not advocate any particular religious (or nonreligious) perspective; however, it does address many topics that arise in science-faith discussions, such as the anthropic principle, interpretations of quantum mechanics, the unreasonable effectiveness of mathematics in natural sciences, chaos theory, philosophy of science, et cetera. At many conjunctions, a deity is posited as a possible solution among others to mysteries arising from these topics.

Let us seek to fathom those things that are fathomable and reserve those things which are unfathomable for reverence in quietude. (Goethe, quoted by Yanofsky, p. 354 n11)

The modern scientific revolution has resulted in an explosion of human knowledge and understanding of the workings of the universe. We have gained immense predictive capacities and developed remarkable technological innovation. And yet the methods of science and mathematics now see their own limits. This may seem humbling, and it is, but as the author concludes, as humans we typically live beyond reason. We make decisions not purely on logic and reason, but by feelings and intuitions. We value beauty, ethics, and wonder that defy rational explanation but provide life with real meaning. I would add that the transcendental conditions of our experience are not sensible unless we say that they are grounded in Jesus the author of life.

Overall, an enjoyable book that I am sure I will return to in the future.

Reviewed by Sam Pimentel, Assistant Professor of Mathematical Sciences, Trinity Western University, Langley, BC V2Y 1Y1.

BIG BANG, BIG GOD: A Universe Designed for Life? by Rodney D. Holder. Oxford: Lion Hudson, 2013. 208 pages. Paperback; \$14.95. ISBN: 9780745956260.

I received a copy of this book for review just at the time that observational evidence for the effects of gravitational waves from the very early universe,

and thus for primordial cosmological inflation, was announced by the BICEP2 collaboration. Since that time, some doubts have been expressed about this claim, so that it cannot be regarded as definite as this review goes to press. In any case, the news highlights the timeliness of a book dealing with cosmology and religion. The strong support that it provides for inflationary cosmologies also has implications for parts of this book's discussion. (For example, the ekpyrotic universe, sketched here on p. 125, now seems to be ruled out and the case for a multiverse is strengthened.)

Rodney Holder, who has degrees in both theology and astrophysics, is a former Course Director of the Faraday Institute and currently a fellow of St. Edmund's College, Cambridge. This book, his fourth in the science-religion area, is a very competent presentation of the history and current state of scientific cosmology as part of an enterprise of natural theology.

The survey of the development of modern cosmology, with emphasis on big bang models and their triumph over the steady state theory, shows how religious discussions accompanied the scientific advances. Some, like Fred Hoyle, resisted anything like a traditional understanding of creation whereas others, including Pope Pius XII, used evidence for a big bang to support a Christian apologetic. Georges Lemaître, a Roman Catholic priest who was one of the main figures in the development of models of an expanding universe, provided a salutary example by refusing to make an easy identification of scientific and theological concepts.

And as Holder points out in his chapter "The Christian Doctrine of Creation," it is wrong to identify the idea of a "moment of creation" as the primary meaning of the Christian doctrine. The basic point of that teaching is that all things depend ultimately on God alone for their existence. God's ongoing work of upholding the universe—and this means also being the driving force of an evolving cosmos—is at least as important as the divine work of bringing the universe into being.

Thus claims of cosmologists such as Krauss and Hawking that science has removed any need for God, are considerably weakened. But the author goes on to show clearly the incoherence of arguments that physics is now able to explain the origin of the universe "from nothing" in anything like the theological sense of *creatio ex nihilo*. The quantum vacuum is not "nothing," as the atheists themselves recognize, so it is only word play to say that the production of

particles from the vacuum is creation from "nothing." Holder brings this out nicely with an amusing passage (and the accompanying illustration) from *Alice in Wonderland*.

Some further consideration here of what it may mean to speak of a "need" for God would have been helpful. Holder quotes Bonhoeffer's prison letters to the effect that the concept of the autonomy of the world began with the speculations of Nicholas of Cusa and Bruno about an infinite universe. But he does not point out that Bonhoeffer gave his own ideas in this matter a Christological grounding, saying in another of those letters that "God lets himself be pushed out of the world on to a cross" (*Letters and Papers from Prison* [Macmillan, 1958], 360). Looking at questions about a need for God from the standpoint of a theology of the cross, as Eberhard Jüngel has done in *God as the Mystery of the World* (Eerdmans, 1983), can suggest answers different from those of a natural theology independent of historical revelation.

Evidence for cosmological fine-tuning and its theological implications are the major themes that occupy the second half of the book. Holder proceeds in a thorough and orderly way toward his answer to the question posed by the book's subtitle. Chapter 5, "The Goldilocks Enigma" (a phrase used by Paul Davies in connection with the "just right for life" character of the universe), sets out twelve examples of the apparent fine-tuning of the universe, including the ratio of the electromagnetic and strong interaction strengths, the value of the cosmological constant, and the dimensionality of space.

Having established that the "coincidences" are real, the book goes on to conclude that these results need some explanation, and to consider what such an explanation might be. The two possible explanations that receive attention in the three final chapters are God and multiple universes. Those possibilities are not mutually exclusive, as Holder indicates by sketching the views of four Christian thinkers who are comfortable with the idea of a multiverse. But he himself sees "Multiple Problems for Multiverses" in a chapter with that title.

If it holds up, the claim of evidence for inflation that I mentioned at the beginning of this review would seem, to many cosmologists, to strengthen the case for some type of multiverse since that is implied by most theories of inflation. If a multiverse does finally have to be accepted, it will not simply eliminate the problems that Holder describes, but will make them questions that need to be answered within a multiverse theory.

Book Reviews

The final two chapters compare two explanations for our “Goldilocks” universe: God, or a multiverse *without God* (that final qualification is crucial). Holder analyzes the probabilities of these two options with the use of Bayes’s theorem (described in an appendix) and concludes in his final chapter that “Theism Wins.” That title is a bit too triumphal for my taste, but it does not affect the strength of the argument. As is always the case with arguments of natural theology, how unbelievers will react can only be known by field-testing these arguments.

Reviewed by George L. Murphy, Trinity Lutheran Seminary, Tallmadge, OH 43209.



ASK THE BEASTS: Darwin and the God of Love
by Elizabeth A. Johnson. London: Bloomsbury, 2014.
xvii + 286 pages, notes, bibliography, index. Hardcover; \$32.95. ISBN: 9781472903730.

“Consider an entangled bank,” invites Elizabeth Johnson in *Ask the Beasts: Darwin and the God of Love*. Through this invitation, echoing Darwin, Johnson pulls her reader into the heart of a theological conversation that listens to the voice of the nonhuman world through the sciences and the Bible. Her vivid and engaging poetic prose compellingly draws the reader through considerations of history, biology, theology, hermeneutics, and ecology.

In the first four chapters, Johnson embarks on a journey through the history of evolution. After a general introduction, chapter 2 explores Darwin’s life and societal context, helping the reader to see the milieu out of which evolutionary theory was formed. Along the way, Johnson dispels several historical myths, such as universal opposition to evolution from the clergy. Chapter 3 carefully outlines the argument of *On the Origin of Species*, tracing through the chapters of the book while highlighting the richest and most memorable of Darwin’s examples. This chapter will give readers who have not read *Origin* a very good idea of its contents and structure. Chapter 4 highlights aspects of the theory of evolution that have changed since Darwin’s day, including the genetic, geological, and ecological discoveries that have adjusted and nuanced (but not replaced) Darwin’s original concept. The first third of the book sets the scene for Johnson’s theological reflection in the next four chapters.

In chapter 5, Johnson re-explores the notion of *creatio continua* through a pneumatological lens. Focus on

the Spirit, she claims, reduces the dualities of mind/body, natural/supernatural, and nature/grace that have led to the misuse and abuse of the nonhuman world. Exploring biblical symbols of the Spirit and a theology of participation, she weaves a deeply Trinitarian approach to creation as God’s dwelling place, allowing one to see afresh the graced sacramentality of nature. Chapter 6 follows on from this, rooting divine action in the empowerment of love. Instead of God’s creative action being something that forcefully directs its objects, Johnson argues that creative action accompanies creatures toward their own fulfilment, allowing them significant freedoms. Johnson defends a neo-Thomistic view of divine action: that God is at work in the world through secondary causes by acting as the primary cause. She carefully sets out her position in contrast to other proposals of divine action, and defends her position with sharp insight.

Chapter 7 seamlessly leads on from the discussion of divine action with an exploration of evolutionary suffering. God creates, we affirm, but the creation groans and suffers in and through this creation. Johnson faces the issues squarely, acknowledging the full necessity of pain, suffering, and death in the ongoing creation and refuses to attribute the natural violence of creation to moral fault or satanic corruption. Nor does she attempt to rationalize evil. Instead, she writes,

Rather than a theodicy, what is needed is a theological inquiry that takes the evolutionary function of affliction at face value and seeks to reflect on its working in the view of the God of Love made known in revelation. (p. 187)

Reflection on the autonomy, or free process, of creation and the compassionate copresence of God grounds her argument. Then Johnson ties together Niels Gregersen’s concept of “deep incarnation” with Sallie McFague’s “Christic paradigm” to argue that God’s solidarity in suffering through Christ and his cross extends to the whole of suffering creation and is not limited to humans alone. Johnson ends with the proposal of “deep resurrection.” She suggests that just as Christ is united to all creation by deep incarnation, so too all creation is tied into Christ’s resurrection by merit of the same unity. “Christ is the firstborn of all the dead of Darwin’s tree of life” (p. 209).

Chapter 8, “Bearer of Great Promise,” moves from the concept of ongoing creation (*creatio continua*) to the notions of creation in the beginning (*creatio originis*) and the new creation (*creatio nova*). In light of theology, what can we say about the very beginning

of the universe and the new creation that will come at its very end? From the original creation, Johnson argues, we can derive the concepts of the gratuitous nature of matter: that it was made freely out of nothing, but also that it was created good. In light of the end of the universe, Johnson explores different concepts of redemption and roots her own view in the idea that the love of God ensures redemption for every creature. The symmetry between creation and redemption is clear: just as God created all things, so also will God renew all things. In both creation and new creation, Johnson is careful to distinguish between scientific and theological viewpoints. Scientific analysis speaks of the Big Bang at one end of the universe and either the Big Crunch or the Big Freeze at the other. None of these ought to be conflated with the theological affirmations of creation out of nothing or the final redemption of new creation.

The last two chapters begin to investigate the questions that humans uniquely bring to the table. In chapter 9, Johnson looks unflinchingly at the issues of pollution, climate change, overpopulation, mass extinction, and the theological injunctions against these abuses. Here, more than anywhere else in the book, a Catholic perspective becomes primary. Chapter 10 compares two models of human-earth relationship: dominion models (including stewardship) and the models that see humanity as part of the community of creation. Johnson advocates for the latter, arguing that it is perhaps the only way to inspire the dramatic changes necessary if we are going to avoid continuing to do irreparable harm to the earth.

Ask the Beasts is an incredibly well-written, clear, and engaging read. While Johnson does not bring a great deal of innovation to the discussion ("deep resurrection" being one important conceptual contribution), she ably navigates the complexities of the science and religion debate. She cuts with the hand of a skilled surgeon, pruning away ossified and dead-end debates, while focusing the reader on the most creative and essential elements of the current dialogue. Her approach is dedicatedly theological while not ignoring, overruling, or side-stepping the sciences. Nor does she give in to the temptation to attribute the attractive parts of nature to God's creative action and the violent or harsh parts to some other ill-defined creative force (such as is found in Deane-Drummond or Hoggard Creegan). The result is a powerfully clear reflection on the nature of evolution, the place of humans in world, and the voice of the nonhuman creation. This book is a joy to read.

Reviewed by Bethany Sollereder, University of Exeter, UK EX4 4QJ.

FOUR VIEWS ON THE HISTORICAL ADAM by Matthew Barrett and Ardel B. Caneday, eds. Grand Rapids, MI: Zondervan, 2013. 288 pages. Paperback; \$19.99. ISBN 9780310499275.

A recent addition to Zondervan's Counterpoints: Bible and Theology series, *Four Views on the Historical Adam* edited by Matthew Barrett and Ardel B. Caneday, is an excellent entrée into the ongoing discussion of the theological implications of Adam's historicity. The book consists of four essays addressing the historicity of Adam from different Christian perspectives. Each essay is followed by a response from individual contributors and concludes with a response to the responses by each essay's original author. The format is ideal for a reader who wants to eavesdrop on this dialogue. While the essays focus on Adam's historicity, inevitably perspectives on the age of the earth, evolution, and the Fall are interwoven in each essay.

Denis Lamoureux's essay begins the conversation. He argues that Adam is not historical, the earth is old, and humans came to be by the process of evolution just like other living things. His argument rests on a strong rejection of scientific concordism and an acceptance of creation as a God-ordained and sustained, purpose-driven, natural process that we can uncover using the scientific method. He argues that scripture, Genesis as well as Paul's writings, describes an ancient scientific worldview, and we need to read scripture through that lens rather than try to fit modern science into a worldview confined by ancient science. Given this foundation, Lamoureux rejects the idea that Adam is a historical figure; rather, he describes Adam as an "incidental vessel to deliver inerrant spiritual truths" (p. 61). Lamoureux, a self-described born-again evangelical Christian, argues that rejecting the historicity of Adam does not impact the foundational beliefs of orthodox Christianity, which he asserts includes the "Bible as the Holy Spirit-inspired Word of God" (p. 39), a belief in miracles, and faith based "only on Jesus Christ, his sacrifice on the cross, and his bodily resurrection from the dead" (p. 38).

John Walton presents an archetypal view of the historical Adam. While he believes that Adam and Eve are real, historical people, he believes that it is more important to understand them as "archetypal figures who represent all of humanity" (p. 89). He believes that an archetypal reading of Genesis helps us find the essential theological meaning of the text: humanity is mortal, provisioned by God, given the role of service in sacred space, and is in relationship with God, each other, and the rest of creation. Not only

Book Reviews

does Walton believe that Adam was historical, albeit archetypal, he also believes that the Fall was a real, historical event in which Adam and Eve were the main participants. Walton leaves room for an evolutionary view of human origins by suggesting that Adam and Eve do not necessarily have to be the first humans or the genetic source of the rest of humanity but rather real individuals that play a “particular representative role in sacred space” (p. 109).

C. John Collins also believes that Adam and Eve were real, historical figures and that the Fall was both historical and moral, occurring at the beginning of humanity’s existence. He allows for an old earth and ascribes to a day/age view, making room for natural explanations of cosmology and geology and human evolution only with a supernatural intervention by God (p. 164). Collins holds tightly to a perspective that places Adam and Eve as the source of all humankind (p. 154) and finds it theologically critical to understand Adam and Eve as the ancestors of all the families of Earth in order to understand Israel’s role in bringing God’s light to all the world (p. 154) or, in other words, to maintain the essential biblical story line. It is unfortunate that Collins wanders into a God-of-the-gaps argument when he suggests that it is “simply unreasonable to suppose that one can arrive at human capacities without some help from outside” (p. 170).

William Barrick takes the most uncompromising position in subscribing to a young earth; a six-day, literal creation; Adam and Eve as real, historical figures; and a literal Fall. He holds firmly to biblical inerrancy and scientific concordism as evidenced in his attempt to explain the relationship between Adam and Eve. “Even the first woman came from Adam,” states Barrick; “she possesses his DNA as altered by God at the time he formed her” (p. 213). He argues that a real, historical Adam and Eve are essential to our understanding of the rest of scripture, including creation, the nature of humanity, sin, salvation, and the authority of scripture. The importance Barrick places on the historicity of Adam is evidenced in his statement, “Denial of the historicity of Adam, like denial of the historicity of Christ’s resurrection, destroys the foundations of the Christian faith” (p. 223). Barrick does not take God’s revelation in the created world and revealed in scientific inquiry into account as he lays out his argument. His own essay and his responses reveal his lack of scientific understanding (p. 81), which makes a meaningful dialogue difficult.

This book does not offer much that is new in the ongoing dialogue around the historicity of Adam or origins in general. All four authors have presented

more extensive versions of their essays in other publications, which they often reference. The book may have been stronger if Peter Enns’s perspective on Adam’s historicity had been included. I also wish that all four authors had made a serious attempt to address the scientific issues that provide insight into human origins. Only Lamoureux deals in any serious way with scientific evidence for human origins.

What this book does offer of significant value is a new and highly accessible synthesis. For readers who want a place to start to explore various perspectives on the historicity of Adam, I would highly recommend this book. The interplay between authors offers valuable insight into the ongoing conversation and reveals areas of serious disagreement and misunderstanding. It is a good resource for those who tend to avoid perspectives that are different from their own since any reader is sure to find themselves aligned with only one or two of the authors.

The book concludes with two pastoral reflections, which are intended to help readers understand what impact the historicity of Adam does or does not have on the Christian life. While this is well intentioned, I found that it only partially worked. Greg Boyd’s pastoral reflection, which calls for unity in a diversity of perspectives on issues that are peripheral to salvation, does achieve a pastoral posture. However, rather than offering pastoral reflection, Philip Ryken offers his own view on the historicity of Adam. I found this ending to the book disappointing and wished that a call for Christian unity and further dialogue had been the final word.

Reviewed by Sara Sybesma Tolsma, PhD, Professor of Biology, Northwestern College, Orange City, IA 51041.

You are invited to draft an article related to

The Image of God and Lab Rats

The ASA and CSCA websites have posted an essay by Keri McFarlane on “Living Relationally with Creation: Animals and Christian Faith.” The essay is intended as an invitation. Readers are encouraged to take up one of the insights or challenges concerning lab rats, pets, hunting, factory farming, vegetarianism ... or maybe a related one that was not mentioned, and to draft a piece (typically about 5,000–8,000 words) that contributes to the conversation. The essay can then be submitted for possible inclusion as an article in an upcoming *PSCF* theme issue.