## Environment

**WASTED WORLD: How Our Consumption Challenges the Planet** by Rob Hengeveld. Chicago, IL: University of Chicago Press, 2012. xviii + 337 pages. Hardcover; $30.00. ISBN: 9780226326993.

The present human population is doomed to collapse at any time, both in numbers and quality of life, because our overly complex society has wastefully used up Earth's resources—unless we immediately reduce our birth rate to nearly zero. This is the urgent message of *Wasted World* by Rob Hengeveld, author of two books on biogeography, formerly on staff in animal ecology at the Free University of Amsterdam, and now affiliated with the Centre for Ecosystem Studies of Alterra in the Netherlands. The book is directed to a general audience, and has a readable style enlivened by numerous anecdotes. There are nine line drawings without figure numbers [but some references to them, e.g., "figure 1 (see page 000)" have not been corrected].

The introduction tells how things are going wrong and what problems can be expected as a result. A brief Part 1 follows, with two chapters on natural processes, explaining how in nature the waste product of one part of an ecosystem becomes the input for another, so that matter goes through a continuing series of cycles, enabling life to continue indefinitely. In contrast, since human processes tend to be linear—mining or harvesting a resource and using it once, eventually producing waste that is degraded and unavailable—our civilization operating this way must come to an end once resources run out.

Hengeveld then develops his ideas in Part 2, "Ongoing processes in the human population," in twenty-two chapters. In the past, the problem of overpopulation led to the agricultural and industrial revolutions, but humanity lost the opportunity that these revolutions gave to solve the problem; instead we let our population grow much more. The small fraction of today's people who are actually engaged in producing food must bear the burden of supporting a much larger number who have established a complex structure of administration and commerce, an abstract kind of society that will disintegrate when mineral and environmental resources are exhausted after their present wasteful use. Energy, produced from fossil fuels that are being depleted, is largely wasted by conversion from one form to another, and its production is polluting the air with carbon dioxide, warming the climate. Earth's water is being contaminated by chemicals, and its land is becoming barren from deforestation, salinization, and dumping of refuse. The world's rich biodiversity, produced by evolution "all by chance, blind to the future, blind to the next day to come" (p. 166), is now being lost.

Next, attention turns to processes within the human population itself. Hengeveld challenges the generally accepted concept of a demographic transition, by which a modernizing country begins with a stable, low population with high birth and death rates, then has a lowered death rate and rising population, and finishes with a stable high population with low birth and death rates. Since nineteenth-century Europe, where this transition first occurred, differed greatly from the poor countries in today's world, any expectation that they will have a similar demographic transition is unduly optimistic. In the chapter "Bursting out of Eden," Hengeveld warns that a logistic model of human population, in which initial rapid growth slows down until the population reaches stability at the carrying capacity, is no more realistic than primitive beliefs that populations were "under the effective control of the gods or their representatives, such as kings or priests" (p. 213).

Chapters on urbanization, migration (e.g., from being "chased away, as may have happened to the Jews in biblical times" [p. 221]), and disease provide details on the influence of these factors. The final chapter suggests a way forward. We humans must find the most effective and least inhumane way to reduce our numbers, in spite of the moral and religious issues raised by any measures to do this. However, Hengeveld asks, "Under conditions of war, famine, thirst, or deadly pandemics, what will be left of our moral values or religious ideals?" (p. 302). His book ends with an epilogue summarizing its message, a note "about the author" in which he explains how his prior work prepared him to write this book, and acknowledgments. The selected bibliography contains over three hundred books, listed alphabetically for each chapter, including roughly equal numbers of academic works and popular writings, but without citations of primary scientific literature. There is no index.

Unfortunately, Hengeveld weakens his credibility by making numerous statements that are oversimplified, inadequately supported, or simply wrong. He asks, "[Could a runaway greenhouse effect] that once happened on Venus also happen here on Earth? Calculations show that this is indeed possible when we continue using fossil fuels the way we have so far" (p. 137). However, this actually "appears to

have virtually no chance of being induced by anthropogenic activities," according to an IPCC Expert Meeting, Buenos Aires, Argentina, 18–20 May 2004, http://www.ipcc.ch/meetings/session31/inf3.pdf (p. 90).

Carbon dioxide emissions from use of concrete (pp. 140–1) are wrongly attributed to the hardening or setting of concrete, a reaction in which cement bonds chemically with water, rather than to the production of the cement, in which fuels are burned to heat limestone to drive off carbon dioxide. The reader is told that "we waste the air we breathe by expelling poisonous gases into the atmosphere" (p. 121) and that there is "heavy and large-scale pollution of surface and groundwater" (p. 133), whereas in the past half century there have been real improvements—in air quality due to requirements for abatement devices on both vehicles and stationary sources, and in water quality as a result of regulation of agricultural runoff and primary, secondary, and tertiary sewage treatment, which is indeed mentioned (p. 53).

Hengeveld is alarmed because a "large category of plastics containing the very poisonous phthalates (plastic softeners) occur in PVC and certain insecticides" (p. 181) and cause danger from pollution. In reality, the situation is being alleviated: use of phthalates as plasticizers and as solvents in pesticide formulations has been curtailed after sophisticated research (both epidemiological and with laboratory animals). Such research linked some adverse health effects to phthalates, originally used as solvents in pesticide formulations and as plasticizers for PVC in toys and medical tubing, because of their low toxicity. Nevertheless, Hengeveld's concerns need to be taken seriously, despite these and other inaccuracies in the case he makes.

Several environmental texts give a better treatment of these themes. Many ways of improving stewardship of resources and the environment, which should lead to stabilizing the world's population, are presented by Gordon College, Richard T. Wright and Dorothy F. Boorse, *Environmental Science: Toward A Sustainable Future*, 11th ed. (Boston, MA: Benjamin Cummings, 2011). The influence of processes within the human population is examined by two writers from colleges in Roman Catholic and Anglican traditions: Charles L. Harper and Thomas H. Fletcher, *Environment and Society: Human Perspectives on Environmental Issues* (Toronto: Pearson Education Canada, 2011). Hengeveld's book is also unattractive to a Christian reader because of its entirely materialistic world view. Although there is an attempt to simplify the scientific details for a general audience, the lack of concern for sound science makes the book unsuitable as a source of information for non-scientists. It does provide a comprehensive set of warning signs that our world is in trouble, but one should be cautious in suggesting to others that they read this book.

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**ENERGY FOR FUTURE PRESIDENTS: The Science behind the Headlines** by Richard A. Muller. New York: W. W. Norton, 2013. 368 pages. Paperback; $16.95. ISBN: 9780393345100.

I thoroughly enjoyed reading this excellent primer on energy—sources, utilization, distribution, and problems. If you had to make a decision to choose a technology that both provides for energy security and affects climate change, what would you do? Although the book will not give you an answer, it certainly helps to clarify what you thought you knew about energy. The book's balanced approach helps to remove some of the emotions that are so tied to the broader issues of energy.

I started the book with the attitude that the advice given to the president had better be the same advice I would give. After all, don't we all have a particular political persuasion? According to the political spectrum Muller provides on page 75, I consider myself to be a "warmist." I trust scientists who work on specific issues to know what they are talking about. I am not a climate scientist so I have to rely on the experts. Muller's goal was to educate the president about energy and not give advice. Good start. The book is very concentrated. I found myself reading a chapter or two and having to put it down and think a lot. When in the first chapter he said that the president did not need to know exactly what energy is and would defer defining it until the end of the book, I immediately found myself at the end of the book reading about how physicists think about energy. When he got to the four-dimensional energy-momentum vector, I knew I was in trouble and immediately returned to the beginning chapter and followed his advice. I already liked him.

I have had many discussions with scientists over the years, and when we talk about the research they are doing, I am always impressed with those who can explain what they are doing in terms that I can understand. I like it when someone takes a napkin and begins to draw pictures or does order-of-magni-

tude calculations that get me beyond what occurs in a test tube. Muller has accomplished this with his writing. I can imagine that we are talking in a diner, and he excitedly confronts my feel-good scientific reasons why we should be driving electric cars with global calculations of the impact of the gasoline-powered cars in the United States on global temperature change—and all on the back of a napkin.

Muller discusses pros and cons of the various energy choices we have for the next two or three decades. The choices were described, not as I have read in short newspaper articles or heard that politicians or extremists on either end of the climate debate would want me to believe, but as logical explanations, based on physics, and importantly, scaled-up engineering principles. His discussion went from acting and thinking locally, to the effects these acts would have globally.

I am all for local environmental change. But I also have to face the reality that any president has to contend with energy security and economic stability. Even these words "security" and "economics" have political color. How can a president be worried about our sources of liquid energy and economics when the world is heating up? Sometimes I lose track of this balance-of-thinking as well. I generally would raise an eyebrow when someone would talk about nuclear power or fracking instead of solar power or geothermal energy. The discussions would get polarized and listening would start to close down. Presidents cannot afford to do this; we cannot either.

Muller uses more of an engineering approach than a physicist's approach in describing energy productivity. He describes the 5,000 wells being drilled at a cost to oil companies of $25 billion, or the 20 million barrels of oil that are used by the United States each day for energy production. He compares the costs of the various sources of energy in constant terms, such as kilowatt-hour, so they can be compared across the board. The scale of the world energy problem is mind-boggling, and he is not afraid to use big numbers and is very capable of making you feel comfortable with them.

The chapters on energy storage were excellent in describing the waste products associated with energy production and use. We need to decrease our production of carbon dioxide where it will have the greatest effect. Using natural gas as an energy source decreases carbon dioxide production by 50% over coal utilization. Changing an energy economy from fossil fuel to something else takes decades, if not longer. Muller argues that we need to make good choices in what research we invest in for both the intermediate and long term. What our world energy economy will be in one hundred years no one really knows, but what we invest our research dollars in now greatly influences that outcome. Understanding energy technology will help us make better choices in the direction we go.

I liked the book. If I were president, I still would not know the answers to the very difficult choices among the issues tying energy, security, and economics together. There are serious issues related to energy that will affect all of our lives. Climate change continues at a rate such that many climate scientists now believe the efforts to reduce emissions will be inadequate to meet the limit of a 2°C global warming by 2050. These scientists now feel that we need to talk more about adapting to a warmer world than about preventing its occurrence.

The Fukushima nuclear plant disaster of 2011 continues to have worldwide implications. Each day three hundred tons of radioactive water from the damaged plant enters the Pacific Ocean, and radioactive material is steadily building up in the ocean food chain. With increased global temperatures, the Arctic Ocean sea ice has decreased to a level that opens this ocean to navigable sea-lanes and deep-water oil drilling. An oil spill in Arctic waters, similar to what occurred in the Gulf of Mexico, would result in oil collecting under sheets of ice. Oil does not decompose readily in freezing water! The Keystone Pipeline proposal to transport synthetic crude oil from the oil sands of Alberta to the gulf coast of Texas has been a politically and environmentally debated issue since it was proposed in 2005. Recently, because of the open Arctic Ocean sea-lanes, the provincial government of Alberta conducted research to find out if an Arctic Ocean shipping plan would make more sense than moving its oil through the proposed Keystone XL pipeline or pipelines west or east through Canada. If you were president, what actions would you take regarding climate change? Is nuclear power an option to be considered as a continuing energy source in the United States? Would you prefer that oil sands production be transported by means of a pipeline crossing the United States, or be shipped by tankers in the Arctic Ocean?

In the "land of the Benedictines" where I come from, we have been taught that Benedictine monks held environmental stewardship as an essential defining value. It is an explicit policy of most Benedictine monasteries and communities world-

wide to apply environmental stewardship principles to their land, buildings, and work. They treat stewardship as the careful and responsible management of something entrusted to one's care (natural resources) and sustainability as meeting current needs without sacrificing the ability of future generations to meet their own needs, by balancing environmental, economic, and social concerns.

Energy transformations and usage touch both stewardship and sustainability. In an article written in this journal in 2006, Fred VanDyke wrote that we should approach the required interventions of stewardship with humility, and that such interventions require diligent scientific study, guided by the determination to work toward God's revealed purpose for nature.[1] This book provides an approachable guideline in our understanding of the science of energy. Our present and future presidents need not only to understand energy, but also to be sensitive to stewardship and sustainability for future generations. I think that, having read this book, I am more open to the ideas of others and less tied to the emotions of the issues. If everyone were to read the book, we would have more fruitful discussions.

[1]Fred VanDyke, "Cultural Transformation and Conservation: Growth, Influence, and Challenges for the Judeo-Christian Stewardship Environmental Ethic," *PSCF* 58, no. 1 (2006): 48–63.

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## ENGINEERING

**TO FORGIVE DESIGN: Understanding Failure** by Henry Petroski. Cambridge, MA: The Belknap Press of Harvard University Press, 2012. 410 pages. Hardcover; $27.95. ISBN: 9780674065840.

A couple of months ago I participated in a highly technical discussion about engineering materials with a fellow professional. The material in question was a ceramic-particulate-filled ultraviolet-curable polymer resin, and the issue of interest was a trade-off between the properties of stiffness, strength, and longevity. While a discussion of this type is commonplace among mechanical engineers like me, this particular conversation was unexpected because it occurred while I was tilted almost flat on my back in a padded chair, between periods of being required to "open wide." The fellow professional, if you have not already guessed, was my dentist. At the time, I considered this interaction to be unusual. But based on Henry Petroski's latest book, *To Forgive Design: Understanding Failure*, maybe I should not have been so surprised. As the author points out in the first chapter, dentistry and engineering have many concerns in common. Both disciplines are involved in carefully placing and maintaining materials to avoid structural failure including, in my case, the consideration of how long my filling might last before breaking down and needing to be replaced with a crown.

I became a fan of Henry Petroski long before reading this particular book. Since the publication in 1982 of the seminal volume *To Engineer Is Human*, Petroski has been considered a sage of engineering design practice. I have cited his work in my papers, shown the video version of *To Engineer Is Human* in my introductory engineering classes, and relied on his explication of the relationship between failure and the engineering design process to mold my understanding of how and why technological projects sometimes go horribly awry. His historical approach not only applies to engineers, but also opens a window for non-engineers into what engineers do every day, bringing to light the creative activities that often result in modern marvels but also occasionally in unanticipated disasters. So, I had high expectations for this book, which were exceeded for the most part, with one exception which will be revealed later on in this review.

Obviously, a correct understanding of the character of past engineering failures is required in order to avoid future disasters. In this book, Petroski contends that society is too quick to blame poor technical design, when, in fact, most disasters are caused by interacting failures that, in many cases, could not have been foreseen by the designers. These failures can occur not only during the design process, in the implementation of the design (construction or manufacturing), but also while the designed technology is used (perhaps abused) over time. The many examples that he describes in satisfying detail support this contention and emphasize the limitations that economic and cultural contexts place on engineering design activity.

While Petroski claims that the "knee-jerk reaction, especially among the mass media, to look for the culprit" of a highly visible failure results too often in blaming "the design and its designers," not all experts would agree with this sentiment. Charles Perrow, another highly respected engineering failure analyst, claims in his book, *Normal Accidents*, that the blame for engineering disasters is too often placed on human error, particularly on individuals who make mistakes when trying to manage time-

dependent, complex technological systems. While the two authors might differ as to where the media and legal system get it wrong, both Perrow and Petroski, especially in *To Forgive Design*, highlight the unanticipated interaction of multiple small failures within complex engineered systems, not all of them technical, as the rationale for large-scale disasters. This recognition of multiple causes is necessary for a truly robust understanding of engineering catastrophes.

A Christian framework of reference can distinguish several categories of these small failures that have the potential to combine and induce a disaster. The first is our own human finitude, including the limitations of our predictive models and the unanticipated variations in physical materials that affect designed structures. The phenomenon of crack propagation and its contribution to brittle fracture, very effectively elucidated by the author in chapter 5, provides an example of this type of engineering failure.

Petroski also mentions failures related to a second category: societal fallenness. The political and economic contexts within which modern technology operates can emphasize, for example, cost-cutting, which can increase risk, as it appears to have done in the case of several construction crane failures detailed in chapter 13.

A third category of causes relates to individual sinfulness, including the unethical choices sometimes made by system participants. This category is highlighted in Petroski's revelation of a contractor falsifying concrete-mixing records in the run-up to a severe water leak problem in Boston's "big dig" tunnels. Recognition of risks posed by our finite and fallen human nature, at both the personal and cultural levels, supports Petroski's conclusion that all innovation necessarily involves risk. Despite the inevitability of future failures, the author maintains a reasonable balance between disappointment in the number and scope of past disasters and celebration of the many real benefits of past large-scale engineering projects.

I appreciated the clear analysis of a wide variety of engineering failures. Many of the heavy hitters of the engineering disasters line-up are presented for scrutiny in this book, for example, the Tacoma Narrows bridge collapse, both space shuttle disasters, and the Deepwater Horizon oil spill. The book also includes many relevant cases that may not have made news headlines at the time of their occurrence. When engineering and technology have become so strongly associated with computers and digital entertainment, often more antiquated infrastructure and transportation systems take a backseat. I enjoyed the focus of this book on the structures that we depend on every day but mainly take for granted. The writing is engaging and even suspenseful. Forensic accident investigation, just like crime investigation, requires great attention to detail, and Petroski provides this as he integrates physical evidence into evolving failure theories in the aftermath of a technological failure. The interjection of personal experiences into the narrative also helps the reader to relate to the technical material.

Although other reviews have pointed out some of the features described above, I find it interesting that none have seen fit to question or explore the book's intriguing title. My primary disappointment with the book is not so much with the actual message and content as it is with what I felt was missing based on that title: *To Forgive Design*. Who needs to be forgiven, and who needs to do the forgiving, in the context of engineering failures? As I progressed chapter by chapter through the book, I eagerly waited for this subject to be addressed. Unfortunately, it never was.

Petroski is a virtuoso of detached explanation of disasters and their outcomes. He deliberately assumes the role of unbiased reporter. His apparent lack of ulterior motive enhances the credibility of his historical analysis. However, forgiveness depends on justly assigning blame for wrongs. The author's refusal to make any moral judgments as to the justice of conclusions reached following engineering disasters does not shed light on the place of forgiveness. Christian admonishments to forgive usually refer to a personal decision to excuse a blameworthy person. This makes sense only when blame is individual and the wrong was intentional. The meaning of forgiveness is less clear in a situation in which a person has unintentionally caused harm, which is the case for the vast majority of failures described in the book. Blame is not as easily allocated when an action is considered an accident or a mistake, at least as long as due diligence was pursued. Common wisdom might interpret forgiveness as forgetting and moving on, putting the past behind us, but this does not fit Petroski's supposition that engineers need to be informed by a historical understanding of disasters. His perspective would seem to require remembering rather than forgetting.

Technology development and engineering design are clearly human cultural activities. Therefore, any forgiveness needed for failures must recognize that bad consequences are often caused by aggregate

systemic effects, as well as by blameworthy individual actions. Petroski's focus on external factors that constrain the design process could be interpreted as a plea for society to forgive the design and designers. However, this appears to let engineers too easily off the hook, when they should, in fact, be encouraged to assume more, not less, responsibility for attending to the possible risks of designed systems. Failures may be to some extent unavoidable given the nature of reality, but Petroski wants to emphasize that more attention needs to be paid by engineers to anticipating failure modes. The message to engineers should be one of caution, but also one of encouragement to broaden the scope of their engineering analysis in order to contend with political and economic impacts.

The few photos included in the text were very helpful in illuminating the engineering failures described. I wish there were more. While Petroski does a masterful job of explaining complex geometries and technical design features in the text, interpretation of his conclusions would have been easier with more graphics, particularly sketches and diagrams. For engineers, a picture can be worth a thousand words, or at least make the thousand words a lot more intelligible. As a remedy for this lack, my suggestion would be to employ web searches strategically as you read. For example, when I came to the section on early construction cranes, I googled "Petruvius" and "medieval crane." This resulted in a plethora of images from which I could pick out a few that matched the text description, thus clarifying the terminology.

As Petroski wisely notes in his final chapter, there is a natural propensity among engineers to see technology as continuously advancing and to view older, supposedly obsolete systems as having nothing important to teach regarding future designs. *To Forgive Design* refutes this, and will be an especially worthwhile read for engineering students, practicing engineers, and anyone else with a healthy curiosity about the limitations of contemporary technological systems. I also strongly recommend the book for the influence it provides in countering a tendency in engineering to devalue scholarly work that focuses on the context of engineering practice, rather than on the equations and experiments that constitute the more technical aspects of scientific engineering analysis. This book is a noteworthy example of successful integration of the hard and soft sides of engineering, which should allow engineers, scientists, and policy makers to better appreciate the cultural embeddedness of engineering work, and therefore better negotiate the risks of living in our modern technological society.

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## ETHICS

**THE UNDEAD: Organ Harvesting, the Ice-Water Test, Beating-Heart Cadavers—How Medicine Is Blurring the Line Between Life and Death** by Dick Teresi. New York: Vintage Books, 2013. 291 pages, endnotes, bibliography, index. Paperback; $16.00. ISBN: 9781400096114.

In our age of ever-increasing breakthroughs in medical technology, it is possible to forget the amazing healing power of solid organ transplants, and the very real ethical issues raised by these well-accepted procedures. While issues of justice in access to donor organs surface occasionally in the press, it has been many years since I read a discussion of the ethics of brain death and the complicated factors that must surround the donation of organs in a usable form for the recipient. In *The Undead*, journalist Dick Teresi investigates organ transplantation largely from the point of view of the donor. He develops a historical path through societal definitions of "death," beginning in ancient Egypt and continuing through the present day. An interesting section in chapter 3 analyzes the "Harvard criteria" for brain death, the significant results of the 1968 "Ad Hoc Committee of the Harvard Medical School to Examine the Definition of Brain Death." These standards consist of four criteria to indicate a permanently nonfunctioning brain: unreceptive/unresponsive patient, lack of movement or breathing, no reflexes, and a flat EEG. Teresi points out that these criteria were based on theory, not studies on patients who met the criteria and did or did not recover. However, the criteria have become the standard for declaring death in the US following the 1981 Uniform Determination of Death Act.

Teresi observes that in practice, the EEG is rarely used in declaring a patient brain dead. He declares this a serious omission, most notably because three years after publication of the Harvard Criteria in the *Journal of the American Medical Association*, University of Minnesota physicians measured positive EEG readings in five of nine patients for whom the first three Harvard criteria—today's standard for brain death—applied. The disconnect between the criteria for brain death and the actual medical practices used in declaring brain death are the focus of the rest of

the book. Teresi describes other populations of patients who could be potential organ donors: anencephalic infants and patients in persistent vegetative states (PVS). A large section of the book addresses how new advances in brain imaging have shown that at least for PVS patients higher brain function is not infrequently maintained; giving the patient the ability to communicate his or her higher brain functions is what is difficult in some cases of stroke or other brain damage. The measurable physiological responses of organ donors to the stresses of their final surgery, organ harvesting, is also discussed in an attempt to ask if these individuals are truly dead or not at the time of harvest.

Teresi raises many questions about whether our definition of "brain dead" is physiologically accurate, and thus whether our current practices for organ donation are ethical. The movement toward implied consent for organ donation in many countries makes this issue more urgent to address, as personal choice for donating organs in these situations may be eroding. Unfortunately, Teresi provides no suggestions for solutions to these thorny issues. He does, however, expose enough situations in which families have been pressured into organ donation, or corners have been cut in declaring brain death, to make the reader wonder why the medical community is not developing better protocols or reliably using those that are in place. Teresi posits that the financial benefit to the individual healthcare providers and their institutions is great enough to highly motivate them to make the donations happen.

*The Undead* is a thought-provoking book. It is written in an engaging style, and organized into small vignettes that make the reading easy, although occasionally disjointed. Case studies of real patients are sprinkled throughout, which draw the reader into the topic at a more personal level. There is little to no religious reasoning in the ethical analysis, or even standard philosophical treatments of the ethics, but as a starting point for a discussion of the thorny and often overlooked issues associated with organ transplantation, this book is an excellent resource and compelling read.

The book would be more useful for discussion in church education sessions, small groups, or classrooms in Christian education settings if it were paired with readings that reflected on Christian responsibilities to the terminally ill and/or injured, or simply Christian responses in the face of death. Making heartbreaking choices about continuation of treatment versus organ donation is aided by accurate information about the biology—even acknowledging the murkiness in our current biological definition of death. However, making those decisions with the help of one's faith, faith community, and the thoughts of Christian theologians and ethicists is a better road for believers.

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## General Sciences

**SHAPING A DIGITAL WORLD: Faith, Culture, and Computer Technology** by Derek C. Schuurman. Downers Grove, IL: InterVarsity Press, 2013. 138 pages with index. Paperback; $18.00. ISBN: 9780830827138.

"What does Silicon Valley have to do with Jerusalem?" With that play on Tertullian's ancient remark about Athens and Jerusalem, Derek Schuurman begins his discussion of the relationship between Christian faith and computer technology. It turns out that the answer is "quite a lot." The book presents a broad but thorough overview of issues a Christian in the computer field ought to consider.

Schuurman teaches at a Christian college in the Reformed tradition (Redeemer University College in Ancaster, Ontario) and approaches his subject from that perspective, drawing heavily on writers in the Kuyperian tradition. Four of the six chapters focus on the relationship between computer technology and the four great themes that compose a Reformed worldview: Creation, the Fall, Redemption, and Restoration. An introductory and concluding chapter round out the book.

The author sees technology as part of the latent potential of creation, and the doing of technology as a form of obedience to the cultural mandate (Gen. 1:28). The creativity involved in doing technology flows from our having been made in the image of God. Schuurman here cites Frederick Brooks, a believer who is well known in the field of software engineering:

> Why is programming fun? What delights may its practitioner expect as his reward? First is the sheer joy of making things. As the child delights in his mud pie, so the adult enjoys building things, especially things of his own design. I think that this delight must be an image of God's delight in making things, a delight shown in the distinctiveness and newness of each leaf and each snowflake. (p. 37, cited from Brooks, *The Mythical Man-Month,* p. 7).

Thus, the creativity of technological work is something that we share with all of humanity. As Schuurman puts it, "regardless of the faith commitments of those who discover new technologies, we are all working with the bounty of God's creation" (p. 57).

But technology, like all of creation, has been damaged by the Fall, though the author explicitly rejects the thesis that technology is a result of the Fall, seeing it instead as "part of the latent potential in creation" (p. 64). At the same time, he notes that "computer technology is not neutral; it can either be directed in ways that comport well with God's intentions for his world or in rebellious ways" (p. 65). Schuurman cites as examples of rebellious use of computer technology such phenomena as compulsive computer use, technology driven by efficiency at the expense of other considerations, failure to recognize the value of people as human beings, and reliance upon technology to produce *shalom*. (Responsible use of technology is discussed in-depth in the next chapter.) One fascinating question he discusses in this chapter is whether the phenomenon of "bugs" can be regarded as part of the consequences of the Fall, some of the "thorns and thistles" of the curse. While regarding the inherent complexity of computer programming as part of the creation, he asserts, "the drudgery and harmful consequences of bugs and failed computer projects are certainly a result of the fall" (p. 69).

The next chapter, entitled "Redemption and Responsible Technology," is the longest and perhaps the central chapter in the book. Schuurman rejects the notion that there is such a thing as a distinctively Christian sort of computer technology. Nonetheless, faith does make a difference in how we approach our work. He writes, "Our faith can motivate us to do our technical work well as a way to be faithful stewards and to show love for our neighbors" (p. 74). He then lists a number of norms that should govern the way a Christian approaches computer technology. Most of the norms he lists, while comporting with biblical teaching, are also ones that many secular practitioners would embrace. While I found myself agreeing almost entirely with the norms he espoused, I also found myself wishing that more was said about how these norms follow from biblical principles, especially in areas where there are differences of opinion among secular practitioners.

In his fifth chapter, dealing with the future, the author discusses optimistic and pessimistic views of the future of technology. He rejects utopian views as a form of postmillennialism, and despairing views as incompatible with the understanding that the potential for technology is part of a world which God both created good and is now redeeming through the work of Christ. Here again, I wish that he had developed biblical teaching more fully. For example, while I agree with his rejection of the singularity views espoused by writers like Ray Kurzweil, I know Christian students who are fascinated by this emphasis, and I wish that Schuurman had more fully developed just how the singularity view is incompatible with biblical faith.

The book ends with a short, concluding chapter and then a series of discussion questions that could be used in a Bible study or college classroom. Summing up, this is a well-written book that fills an important gap. I know of no other book that is like it.

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**THE UNIVERSE WITHIN: Discovering the Common History of Rocks, Planets, and People** by Neil Shubin. New York: Pantheon Books, 2013. 225 pages. Hardcover; $25.95. ISBN: 9780307378439.

*The rocks are speaking to you!* These words, spoken by a geology professor on the first day of class, inspired a colleague to study the environment. While reading Neil Shubin's latest book, *The Universe Within,* I could not help but be reminded of my friend's tale during a summer workshop that we attended. In her story, she related her fascination in understanding the stories that rocks tell. "The rocks are speaking to you" could easily be the title of this book. Shubin does a good job demonstrating the significant clues to the past that rocks hold—fossils being one of many types of clues. The book shows that ignoring these clues is foolish to anyone who desires to understand how life evolved on this planet.

Readers with a weak science background may have some difficulty grasping the scientific concepts as Shubin moves from one concept to the next. His descriptions are good, accurate, and most appropriate for readers with a well-rounded science background. There is not a great deal of detail provided by the author when discussing concepts such as the big bang, the creation of elements within stars, plate tectonics, and the formation of solar systems, to name a few. However, teaching science concepts and theories is not the main goal of the book. Shubin is more interested in presenting the connections that led scientists into postulating current theories about the origins of life based on data collected from

rocks, which are hundreds of millions of years old. He does a good job illustrating how rocks carry information about events long since passed. Those readers that are not well versed in the sciences may not understand completely, but they will understand the big picture and be able to follow where his stories lead.

The book shows the reader that evolution is truly an interdisciplinary field, and it provides examples of the valuable input from various fields in piecing together the story of life on this planet. Throughout the book, significant contributions by biologists, chemists, physicists, and geologists are highlighted to demonstrate how difficult it is to discern evolution of life and how small details and discoveries, which many would consider having little value, provide insight and give rise to great discoveries or new avenues of research. Shubin succeeds in demonstrating these connections through the stories that he includes. By relating personal tales from his years of field experience, he illustrates the difficulties and hardships that go into collecting data from rocks and the perseverance of dedicated scientists. He also discusses the lucky breaks that led to some amazing scientific discoveries.

The anecdotes that he weaves into his chapters are amusing. The stories make the jump from one concept to the next more enjoyable. They dismiss the notion that science is boring and help readers realize that there is a lot of excitement, and interesting stories, behind the scenes of scientific discoveries. Everyone will appreciate the anecdotes and, in some ways, relate to the struggles in scientific research. Obviously, I do not want to spoil any surprises, but my favorites in this book are Shubin's personal stories about his first trip to a Greenland field site, Camp Century, and the string of tales related to the theory of plate tectonics. I feel these stories will encourage readers to delve deeper into the history of science, where they will find that even scientists struggle with accepting new ideas and shifting paradigms. In addition, I appreciated that the titles of the chapter did not reveal the content. They were very appropriate and gave me a chuckle at the end of each chapter.

Shubin's writing style is concise and straightforward. The flow of information is linear and the connections are clear. Readers will not have difficulty finishing the book. His "Further Reading and Notes" are very beneficial. For those who desire to learn more, the section is organized, using the book's chapters as a reference. It includes relevant articles, YouTube links, supplementary explanations for concepts, and recipes for dehydrated meals to use in fieldwork. I appreciated that he includes some context instead of a simple list of information, because it strengthens the reader's desire to seek out the information.

While this book is not written from a religious viewpoint, it exemplifies an interesting idea that could play a more prominent role in Christian discussions of evolution, namely, the important links between environment and the history of life on Earth. Many Christians advocate a philosophy of global stewardship, which has been the theme of several addresses and declarations by Christian leaders along with articles in *PSCF*. The connections between the lifeless and living components of the planet discussed by Shubin reinforce the view that humans are part of this planet, not a separate entity. We should be more responsible in our use of global resources, because we may lose more than just its beauty. We may lose important clues to understand ourselves and to help us carry out our mandate for caring for the earth.

After reading this book, I can honestly say that I appreciate a little more the journey of life on this planet as told from the rocks' point of view.

*Reviewed by Jerry H. Kavouras, Associate Professor of Biology, Lewis University, Romeoville, IL 60446.*

## History of Science

**I DIED FOR BEAUTY: Dorothy Wrinch and the Cultures of Science** by Marjorie Senechal. New York: Oxford University Press, 2013. ix + 300 pages. Hardcover; $34.95. ISBN: 9780199732593.

What role should beauty play in the formulation of scientific hypotheses? The title, and this book itself, allude to both Dickinson's poem on the kinship of beauty and truth as well as C. P. Snow's works on the culture clash between science and the humanities. Relying heavily on Wrinch's private papers and letters, the dominant themes include the role of aesthetics in science and the role of obsession in the life of scientists. Marjorie Senechal is professor emerita of mathematics at Smith College where, as a new faculty member in 1968, she began collaboration with the polymathic Dorothy Wrinch. Senechal presents Wrinch's journey from mathematics to protein chemistry, accompanied by excursions through philosophy of science, theoretical biology, seismography, crystallography and x-ray diffraction. Wrinch contributed almost two hundred articles and books

in these diverse fields. We learn along the way almost as much about Senechal's own ambivalence about beauty, symmetry, and order as we do about Wrinch's obsession with geometry and pattern. Like her mentor, Senechal has published on a diversity of topics including crystallography, symmetry, tiling, Escher, the cultures of science, silk, and Albania.

Wrinch (1894–1976) attained first-class honors in math at Cambridge where she fell under the influence of Bertrand Russell's philosophy, logic, and political ideas. She was an early member of the Heretics Club, which formed specifically to question authority and religion. When Russell lost his position at Cambridge she accompanied him to London, where he privately tutored a small group of exceptional postgrads, and she arranged the publication of Wittgenstein's *Tractatus* while Russell was in prison. Much gossip on the lives and loves of Russell's coterie lies scattered among the more mundane academic details.

While teaching in London she completed her MSc and DSc with mathematician John Nicholson, whom she married. They moved to Oxford where Dorothy taught and received the first DSc awarded to a woman at Oxford on the basis of fifteen more publications. Soon after their daughter's birth, John became institutionalized due to alcoholism and mental instability, and they divorced. During this period, she published prolifically in math, probability, and philosophy of science. *The Retreat From Parenthood,* published in1930 under the pseudonym Jean Ayling, elaborated on the plight of professional women forced to choose between a successful career and successful "breeding." Her book, written in the heyday of J. B. Watson's behaviorism, includes a chapter entitled "Homes are Hell," and proposed a national service to redesign homes and provide services for families and centers for unlimited daily or longer-term childcare. Although the British academic scene in the early twentieth century was undoubtedly a difficult place for women, especially single mothers, Senechal glosses over the sources and implications of Wrinch's views on parenting and fails to make the obvious contrast with the emphasis on beauty and symmetry in science.

In the 30s, with her daughter in boarding school, Wrinch visited labs across Europe reinventing herself academically in molecular biology through the application of mathematical theory to chromosomes and then to protein structure. On the basis of this work, Wrinch was awarded a five-year Rockefeller grant, moved to the US, and became well known for her work on X-ray diffraction in crystals and her proposed model of protein structure based on a fabric of interconnected six-sided rings that she called cyclols. Eventually, she proposed that the rings folded into a hollow cage with a hydrophobic interior. This was the high point of her career and Irving Langmuir nominated her for a Nobel Prize. Other friends and supporters included Michael Polanyi, C. H. Waddington, Niels Bohr, and John von Neumann. It was about this time that she wrote to a friend admitting anger at her daughter's participation in church events, which she suspected had to do with filling the loneliness caused by maternal neglect.

In spite of the initial excitement over her proposed model, it was criticized most severely by Linus Pauling who claimed that the cyclol structure was too unstable to exist. He advocated collecting evidence by the breakdown of whole structures into parts rather than making mathematical deductions from geometry and symmetry of the whole. This bottom-up versus top-down approach pitted the culture of chemistry against the culture of mathematics. Pauling began a prolonged campaign against Wrinch, whom he accused of "affinity for the media" (p. 161) and dishonesty (p. 165, 281, notes 3–5). Senechal presents Pauling's obsession with debunking cyclols as a major reason why Wrinch's grant was not renewed, and she failed to find an appropriate position. In the end, both Wrinch and Pauling were wrong. Cyclols have never been found in proteins, but, in the 1950s, they were found to exist naturally in thousands of alkaloids. Pauling's own obsessive preoccupation with vitamin C suffered a similar demise.

After losing her grant, Wrinch married biologist Otto Glaser of Amherst and was appointed research professor of physics at Smith. During this period she wrote on the use of Fourier transforms in determining the structure of crystals. At the outset of her thirty years at Smith, she confided to an English friend that she was unhappy with the isolation and lack of adult students there; nevertheless, after Glaser's death, she lived in residence at Smith for over twenty years. She continued until retirement to write prolifically in defense of her protein theory.

One take-home message of this book is that science is ultimately not built on preconceived Platonic notions of beauty and order. You have to take the data as is. Beauty may be a useful criterion but only when competing hypotheses are equally supported. Wrinch was unable to give up her hypothesis and became isolated and resentful about her lack of success. The lives Senechal portrays remind us of

the human frailty of great men and women and that, although math and geometric symmetry may be beautiful, real life is invariably messy.

Readers interested in history, methodology, and philosophy of science are likely to find the book of general interest, and in particular a useful source of material on the treatment of women in early twentieth-century academia. Most readers outside the area of molecular biology will, however, find the research details obscure. The narrative jumps about and sometimes seems disjointed, but overall provides an interesting portrait of a brilliant woman. Even though the book reads like a Who's Who in math and science, Senechal thankfully provides an appendix listing the major characters and their roles in both science and Wrinch's life. There is also an index and fifteen pages of notes, many of which derive from private letters and notes organized by Senechal after Wrinch's death.

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## PHILOSOPHY & THEOLOGY

**CLEANSING THE COSMOS: A Biblical Model for Conceptualizing and Counteracting Evil** by E. Janet Warren. Eugene, OR: Pickwick, 2012. 336 pages. Paperback; $37.00. ISBN: 9781620324035.

In her book, *Cleansing the Cosmos*: *A Biblical Model for Conceptualizing and Counteracting Evil*, Janet Warren constructs a model for understanding and responding to evil that is anchored in scripture's spatial/boundary metaphors and that is intended to serve as an alternative to the warfare model that has become quite popular today. Rather than conceiving of God and all who align with him "battling" forces of evil to free humanity and the cosmos from their grip, Warren's spatial model construes forces of evil more along the lines of dirt that needs to be swept out of the cosmos in order for it to become the all-encompassing "sacred space" that God has always wanted it to be (e.g., p. 157).

I found much of value in Warren's informative work. One of the book's greatest strengths is the masterful way Warren integrates a broad range of scholarship in the process of recasting central components of the biblical story with the use of spatial and boundary metaphors (pp. 80–250). The breadth of scholarship Warren employs reflects the fact that this book is a reworking of her doctoral dissertation (University of Birmingham, UK). Yet, this book is relatively free of technical jargon and is thus accessible to most lay readers. Another particularly strong aspect of this book is chapter 2 in which Warren sagaciously brings readers up to speed on the current discussion on the nature of metaphors in defense of her "critical realist" epistemology (pp. 29–52).

Yet a third feature of this book that is particularly strong is the highly creative manner in which Warren elucidates theological concepts by drawing on analogies from contemporary science. For example, chaos and complexity theory are used to articulate the way demonic forces self-organize and create emergent properties that impact the world in chaotic, nonliner, indeterministic ways (e.g., pp. 72–6, 79, 83, 171, 218, 223, 230, 271–2). So, too, while I will later argue that Warren's ontology of evil is highly problematic, I cannot help but appreciate the creative manner in which she attempts to capture its "nothingness" by drawing analogies with such things as "dark matter," "dark energy," "virtual particles," and "quantum fields" (e.g., pp. 70, 77–8, 124, 163, 252, 269, 271).

While I think that the strengths of this book rendered it worth reading, there are, unfortunately, a number of things that weakened it considerably. For the purposes of this review, I will restrict myself to two sets of criticisms.

First, it seems to me that Warren at times misunderstands and/or misrepresents the warfare models she critiques. For example, Warren repeatedly states that the warfare approach implies that God and Satan are "equal and opposing forces" (e.g., pp. 125, 172, 173–4, 210). She neither cites any advocate of the warfare model who expresses this conviction, nor provides any line of argumentation in its defense. I can only assume that Warren considers this strong claim to be self-evident.

If anything is self-evident, it seems to me it is that Warren's assumption is mistaken. Every earthly war that has ever been eventually won by one of the opposing sides was a battle between forces that were obviously *not* equal. Yet, I doubt anyone would hesitate to call them genuine "wars" on this account. So, too, the fact that all orthodox Christian advocates of the warfare model hold that God is guaranteed eventually to defeat Satan demonstrates that they do *not* hold that spiritual warfare is between "equal" forces. Unfortunately, this aspect of Warren's critique of the warfare model is hardly peripheral to her overall thesis, for it factors strongly into other negative evaluations of the warfare model (e.g., as

undermining God's sovereignty [pp. 125, 213], as "dualistic" [pp. 125, 213, 250, 271], and as ascribing "excessive reality" to Satan [pp. 62, 71, 270]).

Judging from the way Warren interacted with my work in particular, I suspect that some of her misunderstandings of warfare worldview may be due to a less than careful treatment of her sources. For example, as her only illustration of her frequent claim that advocates of the warfare model fail to appreciate the metaphorical nature of much of the Bible's language about forces of evil, Warren contends that "Boyd … insists that demons and cosmic forces are 'real' spiritual beings, and not 'mere metaphors'" (citing page 91 of my *God at War).* After her citation, Warren goes on to state that Boyd "appears to think that 'spiritual warfare' is not a metaphor or model" (p. 51), while elsewhere she contends that I do not seem "to recognize that metaphors can depict reality" (p. 113).

If you check out the context of Warren's quote, you will find that I am speaking about the Old Testament's depiction of malevolent cosmic forces as "the deep," "the hostile sea," and the "raging waters." I state that, given the original cultural context of the biblical writers, these concepts "cannot be taken as mere poetic flourishes" (*not* "mere metaphors"). I then contend that "the very meaning of such expressions in ancient culture was predicated on the belief that such demonic realities actually existed." Following this, I go on to argue that "[w]hile believers today cannot affirm as literal the mythological portrayals of the cosmic forces that the biblical authors give," we should nevertheless "affirm the reality to which these mythological portrayals point" (*God at War*, pp. 91–2). In short, I am arguing that the mythic metaphors in Scripture *point to a reality*—the very "critical realist" position that Warren defends and accuses me and other advocates of the warfare model of overlooking.

A second set of considerations that I believe weakens Warren's thesis concerns a number of claims and concepts that struck me as highly ambiguous, and possibly incoherent. The most serious example of this, and the only one that space allows me to address, concerns Warren's conceptualization of evil—a point that is of some consequence inasmuch as clarifying our understanding of evil is one of the central claims Warren makes for her spatial model (e.g., pp. 27, 286). To arrive at her conception, Warren applies her spatial model to ontology (without announcing that this is what she is doing). The metaphor of "center" to "periphery" is thus transformed into a way of speaking about *degrees of reality*. The result is that, though Warren claims her approach is rooted in "metaphorical" rather than "propositional or metaphysical truth" (p. 269), the discussion about the nature of evil that runs throughout her book is steeped in propositional and metaphysical truth claims. And I, for one, frankly found many of these claims to be highly ambiguous, if not incoherent.

To illustrate, throughout her book we find descriptions of evil as rooted in "nothingness" (from Barth) which, she claims, is "not allowed ontological status" (p. 117), has "reduced existence" (p. 175), "reduced ontology" (pp. 210, 270), and "diminished ontological status" (p. 186). Nothingness is thus "less real" (pp. 142, 186, 230, 248, 271) and "quasi-real" (pp. 90, 269, 287). Similarly, "evil," "Satan," and other "forces of evil" are variously described as "non-ontological" (p. 55), "unreal" (pp. 186, 230), "semi-real" (p. 272), possessing "little substance" (p. 210) and a "reduced ontology" (p. 285), while lacking "true reality" (p. 268).

I confess that I cannot get clear what these descriptors mean or how they can be coherently related to one another. How can anything "exist," in a*ny* sense, without being given "ontological status"? Isn't having "ontological status" simply *what it means* to "exist," in *any* sense of the word? Nor is it clear how something can lack "ontological status" and yet possess "diminished" or a "reduced ontological status" (whatever these terms might mean). One would have thought that not being "allowed ontological status" would be *less than* having "*diminished* ontological status," yet both are applied to "nothingness" (which, in any event, I have trouble calling "nothingness" if it has *any* "ontological status," however "diminished"). Nor is it clear what it means for something to lack "true reality" (is there a "*false* reality"?), just as it is not clear how one and the same thing can be "unreal" and "quasi-real."

As I noted earlier, Warren utilizes a host of scientific concepts to give this graded ontological language some meaning, but for all her ingenuity, I think the analogies fail. For example, when scientists such as Paul Davies speak of particles prior to their measurement (i.e., in a state of "superposition") as being "in a shadowy world of half-existence" (p. 77), they are speaking *phenomenologically*, namely, relative to our ordinary experience of the world as composed of stable objects. It is a way of metaphorically capturing the distinct *mode of existence* of a quantum particle prior to its measurement (e.g., the "collapse of the wave packet"). But there is nothing "quasi-real" (p. 272) about a quantum particle in this state if we are speaking *metaphysically*. The sub-

atomic particle exists—as "fully" as anything else exists, otherwise it would make no sense to refer to any *particular* particle in this state or to contrast it with any other existing thing or even with non-existence. It is just that the particle in this state exists in a *distinct mode* that distinguishes it from the mode of existence that characterizes our phenomenological world. I would argue along the same lines for all the analogies Warren uses, as I would argue regarding the ontological status of possibilities, potentialities, dreams, imaginary animals, and so forth.

I would therefore contend that Warren has confused *modes* of existence with *degrees* of existence while assuming (without argumentation) that certain modes of existence (e.g., God, holiness, sacred space) should be considered *more real* while other modes of existence (sub-atomic particles, demons) should be considered *less* real. This ontological privileging of one mode over others strikes me as arbitrary, and I struggle to ascribe any coherent meaning to this "more" and "less" scaling of reality. As I have argued elsewhere (*Satan and the Problem of Evil*), I believe Barth's concept of "nothingness" can be salvaged as a way of expressing that which conflicts with God's will for creation, but only if it is conceived of as a domain of *possibilities* that becomes *actualized* only when free agents, human or angelic, choose to do so against God's will.

According to the warfare model, the choosing of these negated possibilities constitutes the origin of evil, and it is expressed in Scripture's allusions to an angelic fall and its account of the human fall. To my way of thinking, this is the only plausible account of the origin of evil, and the fact that Warren instead favors the concept of "nothingness" as an uncreated quasi-reality (e.g., pp. 86, 257) lies at the foundation of her problematic ontology of evil and constitutes one of the primary reasons why I remain unconvinced that her spatial/boundary model is superior to the warfare model.

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## Religion & Science

**COLD-CASE CHRISTIANITY: A Homicide Detective Investigates the Claims of the Gospels** by J. Warner Wallace. Colorado Springs, CO: David C. Cook, 2013. 288 pages. Paperback; $16.99. ISBN: 9781434704696.

This book offers a unique perspective on the claims of the Gospels, that of a trained homicide detective. As such Wallace approaches the reliability of Christian truth claims with a detective's skill and perspective. Using the same forensic skills he uses when solving a cold-case crime, he looks at the evidence available in the Gospels to determine their reliability and truth claims. Wallace was a vocal atheist for the first thirty-five years of his life. He eventually became a Christian because he discovered the reliability of the Gospel's truth claims using the same forensic techniques that he had employed successfully to solve many cold-case crimes during his career.

The book is divided into two sections followed by an Appendix of Case Files. Section 1 has ten chapters, each dealing with "one of the 10 important principles every aspiring detective needs to master." He proceeds to apply each of these principles to an actual crime scene he had to solve while he was a homicide detective. On the basis of these principles, he then cautions skeptics not to fall into the trap of rejecting Christian truth claims outright.

His ten principles are (1) resisting the influence of dangerous presuppositions, (2) understanding the role of abductive reasoning, (3) respecting the role of circumstantial evidence, (4) evaluating the reliability of the witnesses, (5) examining the choice and meaning of the language, (6) determining what is important evidentially, (7) recognizing the rarity of true conspiracies, (8) establishing reliability by tracing the evidence, (9) getting comfortable with one's conclusions, and (10) distinguishing between possible alternatives and reasonable refutation. These principles then become his "call-out bag and checklist."

Section 2 consists of four chapters and is devoted to applying the above principles to the claims made about the reliability of the New Testament. This section will be very familiar to the ASA reader, but still contains some surprises that only the sharp eye of a detective could bring forth. For example, he observes that if the gospels were written late, they should have mentioned the siege of Jerusalem and the destruction of the temple predicted by Jesus. Why did Luke not mention the death of Peter or Paul? He claims Mark avoids mentioning important names in his gospel (unlike a later rendition by the Apostle John) to protect key players!

It will not be possible to discuss each chapter separately. But they all follow the same forensic approach that Wallace uses. An outline of a couple of chapters will illustrate this uncommon approach that only a detective would use as an apologetic tool.

Wallace starts with chapter 1, entitled "Don't Be a Know-It-All." He describes how he solved his first assignment, a homicide case. The approach he took in solving the mystery was avoiding the temptation of *relying on his initial presupposition* as to who seemed to be the most logical culprit. Only after thinking "outside the box" (unlike his co-investigators) was he able to find the real culprit. He uses this experience to caution others of the dangers of "presuppositional belief," so common among atheists, that is, that only natural laws and forces operate in the world. He identifies mental blocks that would keep someone from accepting the supernatural and encourages the reader to enter the scene "with empty hands" and thus distinguish between what is natural and what is not.

In chapter 2, entitled "Learn How to Infer," Wallace describes how he solved a very difficult homicide case by distinguishing between two answers: the possible and the reasonable. Contrary to what his co-workers surmised, Wallace used an abductive approach to show that the most *reasonable* answer to the crime was that the death was not a suicide, but murder. Then he brings his expertise as a cold-case detective to bear on the forensic aspects of the events surrounding the first Easter, concluding that the most reasonable answer had to be that Christ rose from the dead.

The ASA member trained in apologetics will find many of the tools Wallace uses to defend the truth claims of Christianity to be familiar. His arguments are not as rigorous as those of trained apologists such as William Lane Craig or Alvin Plantinga. The novelty lies in the ingenious ways he weaves his experiences in solving difficult murder cases with how one can use those same methods to defend the faith. In fact, he claims that it was this "empty hand, unbiased approach" that eventually brought him to faith from atheism. This makes reading the book entertaining as well as educational. (For example, the ten homicide cases that he has solved, some against all odds, are alone worth reading.)

Wallace ends the book with three case files. The first case file consists of a list of known experts in the field of apologetics, one or more experts per chapter. These experts are called on to support the arguments used by the author in each of his chapters (e.g., William Craig, Gary Habermas, Paul Copan). The second case file lists names of assisting officers, police, detectives, and others who used their expertise to come to the same conclusion as the author regarding the reliability of the Gospel accounts. The third case file is the list of references used by the author to write his book. I thoroughly enjoyed this novel way of defending the truth claims of Christianity and strongly recommend it to others.

*Reviewed by Kenell Touryan, ASA Fellow, Visiting Professor, American University of Armenia (an Affiliate of UC Berkeley), Indian Hills, CO 80454.*

## Social Science

**THEOLOGY FOR BETTER COUNSELING: Trinitarian Reflections for Healing and Formation** by Virginia Todd Holeman. Downers Grove, IL: IVP Academic, 2012. 205 pages. Paperback; $20.00. ISBN: 9780830839728.

Can theology actually impact how a Christian counselor works? This is the central question that Virginia Holeman tackles in her book *Theology for Better Counseling*. Holeman does not just attempt to answer this question; she demonstrates the answer, by presenting a metamodel of *theologically reflective counseling* utilizing a Wesleyan perspective. This book, which falls into the *Integration* genre (i.e., integrating psychology and Christian faith), is not a book solely for Wesleyan oriented counselors, but rather Holeman uses her own particular theological sensibility as an example and invitation for Christian counselors from other traditions to do the same.

The literature in Christian counseling has often relied on vague rhetoric, treating Christianity as universal, monolithic, and encyclopedic. Holeman argues that when this happens theological particularity is lost and Christian counseling becomes theologically thin. This may then lead to what she calls weak-sense theological thinking, hallmarked by theological ethnocentrism and discomfort with ambiguity. Most importantly, weak-sense thinking can lead to counselors failing to recognize their theological position, and subsequently it becomes a hidden bias which may negatively impact their work.

In chapter 1, Holeman sets out the argument for why Christian counselors should incorporate strong-sense theology, hallmarked by personal theological awareness, curiosity, and respect for alternative perspectives, awareness of theological ethnocentrism, and comfort with theological ambiguity. Strong-sense theological reflection assists clinicians in eval-

uating the clinical systems of therapy from which they work, establishes professional competency to work with religious issues, enables clinicians to employ theological empathy toward clients, and helps clinicians to engage in theological discernment (teasing out constructive and destructive forms of religiosity).

A metamodel for a theologically reflective counseling is advanced in chapter 2, but Holeman notes that this must first be embodied in the personal, spiritual, and professional formation of clinicians. This formation includes theological preparation of the therapist, development of their Christian character, growing in awareness of the Holy Spirit, and the actual practice of the counselor in the room. There are four movements in the metamodel that therapists must engage to be effective: *attending* to theological echoes; *addressing* salient theological themes; *aligning* areas of life to be more theologically congruent; and *attaining* a deepening Christian character in their clients. Holeman then provides helpful examples of what each one of these movements looks like in clinical work. Holeman rightly points out that counselors and clients will not always share the same theological tradition. Because of this challenge, Holeman highlights that theologically reflective counseling does not happen just because a clinician is Christian. It must entail supervision with theologically reflective mentors and ethical commitments to clinical competency (is the therapist really competent to deliver the type of therapy he or she is providing?) and to informed consent (what has the client agreed to in terms of utilizing Christian resources at the outset of therapy?).

Chapter 3 is a hinge chapter in which Holeman employs contemporary understandings of the Trinity as a hermeneutical lens through which to conceptualize counseling theologically. Describing the Trinity as divine persons-in-relations provides a means for also understanding the *therapeutic community* of client, therapist, and God. Since God is already in the room, clients can experience God's love through the therapeutic interchange. The "dance" of the therapeutic community begins to resemble the mutual loving, respecting, and recognizing dance of the Trinity (i.e., *perichoresis*).

In chapters 4 through 7, Holeman demonstrates a theologically reflective counseling utilizing her Wesleyan tradition. Chapter 4 takes up the issue of holiness or responsible living. While many theological traditions speak of personal holiness, Holeman moves the discussion to the realm of *relational holiness* and borrows John Wesley's description of holiness as the enactment of God's love within the church and to the world, in the here-and-now. Therefore, therapists who help clients develop their capacity for loving and relating rightly to others promote holiness. Holeman then engages in practical clinical integration as she puts the idea of relational holiness into conversation with Bowenian family therapy, and describes what she calls *differentiating holiness*. Differentiating holiness includes three important aspects: being able to have a clear "I" position because one is centered on Christ; being able to self-soothe without fusion or emotional cutoff because of the peace of God; and being able to take personal responsibility for one's impact on others through the grace of God. Holeman then demonstrates what this looks like through the use of a case vignette.

In the last three chapters, Holeman takes theology so seriously that she allows it to set the agenda for counseling rather than the other way around. This is *theology-directed* integration, which can be unusual in a genre of literature that is often guilty of privileging psychology's methodology and epistemology. In these creative chapters, she tackles social holiness and social justice (chapter 5), atonement and forgiveness (chapter 6), and finally eschatology (chapter 7). Each of these chapters is deeply rooted in her Wesleyan sensibility, but again, as a challenge to readers to follow her example and dig into their own theological traditions. Chapter 5 is perhaps the most provocative, for it challenges Christian clinicians to move out of an individualistic understanding of disorder toward a social and cultural conceptualization. This is a call for Christian clinicians to become agents of social change, to get out of their offices, to rethink fee for services and to give psychology away.

Holeman has written a unique book in the integration literature. Her theologically reflective practice model is neither treatment-model-specific (she does utilize clinical research on *common factors* that influence therapeutic effectiveness) nor is it generically thin Christianity. It is not psychology with a "side of Jesus" but is a genuine and successful attempt to allow theology (specific, thick, and strong) to have real impact. This book will be very useful for Christian clinical graduate training as well as pastoral care and counseling.

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**MINDS, BRAINS, SOULS AND GODS: A Conversation on Faith, Psychology and Neuroscience** by Malcolm Jeeves. Downers Grove, IL: InterVarsity Press, 2013. 219 pages. Paperback; $20.00. ISBN: 9780830839988.

Pascal wrote, "It is dangerous to show a man too clearly how much he resembles the beast, without at the same time showing him his greatness. It is also dangerous to allow him too clear a vision of his greatness without his baseness. It is even more dangerous to leave him in ignorance of both." This quote articulates both the reason and the goal of Malcolm Jeeves's most recent book, *Minds, Brains, Souls and Gods: A Conversation on Faith, Psychology and Neuroscience*.

The *raison d'être* of the book and its central questions revolve around the uncertainty and fear that Christians express as they wade into scientific research on brains and behavior. Jeeves's goal is to articulate recent scientific findings that indicate how much humans resemble beasts while, as Pascal recommends, simultaneously reassuring the reader of his or her own greatness and importance. The greatness and importance of humans within the sphere of brain and behavior are centered on whether humans have free will, souls, and features that separate us from other animals. Such features, many believe, give us special status in the animal kingdom. And these special features include our moral intuitions and, particularly for Christians and other religious believers, a belief in God.

Jeeves maintains that "a fuzzy boundary between humans and animals is not something that should bother Christians and those holding a religious outlook on life," and then immediately states that, "for many of those who do not believe in God, there is a tacit acceptance that humans are clearly unique in terms of the explosive development of learning, philosophy, literature, music, art, science, religion, and so on" (p. 117). Jeeves is onto something here. He suggests that these grounds—learning, philosophy, literature, music, art, and science—are sufficient for the nonbeliever's tacit acceptance of human uniqueness and greatness. If such endeavors contribute to humans' belief in their own uniqueness and greatness in the animal kingdom, it is little wonder that some Christians believe that their uniqueness and greatness is in question. The atrophy of these intellectual pursuits has left many Christians vigorously defending their intrinsic worth based on religion alone. Within such an atrophied intellectual context, it is easy to believe that any intellectual pursuits outside religion may very well erode both humanity's intrinsic uniqueness and worth. These beliefs frequently haunt believers who venture into the sciences, and particularly those in psychology, biology, and neuroscience. And while Jeeves leaves it to others to describe the causes and development of these implicitly fear-filled contexts, it is within such contexts that he writes.

The book is organized as an email correspondence between Jeeves and an imaginary undergraduate Christian student studying biology and psychology at a secular university. The imaginary student is the synthesis of questions Jeeves has received from students attempting to integrate their faith with findings from neuroscience and the psychological sciences. The product of this synthesis is a student who is at once incredibly bright and oddly naïve. Although the format is, at times, contrived and awkward, it offers Jeeves an opportunity to articulate a warmth and sincere compassion for believers wading into the area and to demonstrate a quiet confidence in his faith in the midst of scientific findings that potentially raise significant questions for believers.

Jeeves addresses these significant questions from perspectives inside and outside the Christian faith tradition. For general questions such as whether humans have free will, he highlights how other cognitive scientists and neuroscientists unaffiliated with a particular faith tradition counter reductionist interpretations of neuroscientific data from within the field of neuroscience. For example, Jeeves quotes Michael Gazzaniga, a Dartmouth College neuroscientist whose experimental work has shaped cognitive neuroscience and whose textbooks have defined the field. Gazzaniga offers several pointed criticisms of standard reductionist interpretations against the existence of free will. For more specific questions regarding Christian faith, Jeeves leans on the perspectives of well-known writers such as N. T. Wright, Mark Noll, Peter Enns, Nancey Murphy, and Justin Barrett.

Jeeves's treatment of theological questions and those related to biblical interpretation and history are engaging but noncommittal. He frequently articulates multiple views, often citing books from the "Four views on …" series, and then offers a qualified nod toward one. More interestingly and potentially uncomfortable for some, he suggests that there are reasonable grounds for reinterpreting scripture in light of scientific findings while simultaneously emphasizing the authority of God as the inspiration of the scriptures. This view is one of the main reasons that Jeeves's writings work: they explore and

maintain an active dialogue between Christian faith and psychology/neuroscience rather than simply allowing one side to dictate to the other. His treatment of questions regarding Christian faith in the light of the rise of evolutionary psychology, social neuroscience, moral psychology, Benjamin Libet's experiments on free will, recent work on "god-spots" in the brain, and more, draws from a wealth of scientific and theological knowledge collected over more than five decades of active research and writing in these areas.

Despite this wealth of experience, Jeeves draws on a few odd sources. For example, he cites Jonah Lehrer, a popular science writer and former neuroscientist, whom Jeeves mistakenly refers to as a psychologist. Lehrer was dismissed from his post at *The New Yorker* in 2012 for plagiarism, fabricating quotes, and factual inaccuracies.

Early in the book, Jeeves writes that his view about the relationship between the mind and brain "may change tomorrow" (p. 30). What will not change is Jeeves's commitment to showing us, simultaneously, how much humans resemble the other beasts of God's creation—both in brain and behavior—and the greatness God offers these fascinating human creations.

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**ANATOMY OF THE SOUL: Surprising Connections between Neuroscience and Spiritual Practices That Can Transform Your Life and Relationships** by Curt Thompson. Wheaton, IL: Tyndale Momentum, 2010. 282 pages. Paperback; $15.99. ISBN: 978414334158.

Psychology, neuroscience, and issues of faith have become increasingly connected. In 2010, this journal published a special issue on that theme: *Psychology, Neuroscience, and Issues of Faith* (62:2). The attempt to integrate these disciplines rather than contrast them is ambitious and promising, leading us toward new hermeneutics and new applications. Curt Thompson's *Anatomy of the Soul* exemplifies this trend. His book is a thought-provoking attempt to link Christian spiritual practice and clinical strategy/outcomes to the way the brain is wired, re-wired, functions, and develops.

This book is the result of the author's personal experience. Reflecting upon a neurobiology workshop conducted by Daniel Siegel that he had just taken, Thompson—who had been called to his dying mother's bedside—came to see his mother, himself, and their relationship with very different eyes, free of regret and condemnation. He became able to truly listen to her, and thus saw her narrative from a new perspective, integrating past experience and its effect on the brain. Thompson notes that such an experience also has an effect on one's spirituality, leading to more undivided heart and mind. Thus the author hopes that the book may "show you how your life, too, can be transformed by the renewal of your mind that leads to the wholeness that God intends for you" (p. xvi). The postulate at the basis of his integration is that "God has designed our minds, part of his good creation, to invite us into a deeper, more secure, more courageous relationship with God and with one another."

Neuroscience, says Thompson, points to God. The findings of neuroscience, attachment, and storytelling offer new language to reintroduce us to God and his work with and within us (p. xviii). Though science is an important grounding for this book, this is not a strictly scientific book. The author uses science both as a factual basis and as a transformative tool, offering new strategies to think and act, and to transform one's spiritual life as well. The audience for this text is very wide, ranging from the lay person to the professional. This can be a problem. As I looked at some of the many online reviews, it was evident that the reading was too demanding for some of the lay audience, too "loose" for the scientifically minded, and yet "just right," intriguing and eye-opening, for a substantial part of the audience as well.

Being of a more scientific sort, I was curious, looking for definite applications, but the first two chapters deal in more general concepts, and the third chapter is a basic explanation of the brain, stressing the left brain–right brain concepts, and the triune organization. I almost gave up in frustration at that point, finding the science too general and a bit dated. Then I came to chapter 4, *Are You Paying Attention?* It is an excellent chapter containing clear applications of clinical cases and interesting correlations with biblical text. This is not text-proofing, but a more narrative, sometimes analogical, use of scripture. It finds echoes, resonances, images, and stories that open one's soul to dimensions of one's relationship with God that might have been overlooked before. Similarly, chapter 5 on memory (implicit and explicit memory, the construction of narratives), and chapter 6 on emotion are also quite well done. In my view, chapters 4, 5 and 6 are the strongest chapters of this text.

# Letter

The next section, chapters 7 and 8, deal with attachment theory (Bowlby; Ainsworth's "strange situation"), and the varieties of attachment that result (secure, avoidant, ambivalent, disorganized) and can influence the development of attachment in adults. There is no specific connection there with neurobiology (except in terms of memory). What is novel though is how the author applies these attachment styles to the manner in which we relate to God. Through the use of biblical narrative and poetry, and through meditative exercises, he helps his clients develop a more stable, secure, loving relationship with God, which can change their perception of reality, hence the title of chapter 8: *Earned Secure Attachment: Pointing to the New Creation.*

Chapter 9, with the engaging title *The Prefrontal Cortex and the Mind of Christ,* presents the synthesizing, reflecting, and moderating function of the prefrontal cortex. It connects spiritual disciplines such as meditation, prayer, fasting, study, and confession to its better functioning, which Thompson connects with "having the mind of Christ." The last few chapters connect Christian themes such as sin and redemption, sin and rapture, resurrection, and living in community with the material developed in the preceding chapter, interwoven with new case studies.

Overall, this is a didactic book (as opposed to a more open, exploratory or descriptive one) organized around a set of topics interwoven with stories and exercises. This would work well with a college-level lay audience, or with students preparing themselves to be therapists. Like Daniel Siegel, who influenced him, Thompson connects his clinical approach to neurobiology findings, stressing neuroplasticity. In addition, the way the author finds echoes of our brain's ways of learning, unlearning, and mislearning in biblical narratives, poem, and themes points to a deeper transformation through prayer and spiritual disciplines, as well as through therapy.

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# Letter

## A Correction to the Review of Russell, *Time in Eternity*

I appreciate the editors' granting me a chance to correct my review of Bob Russell's *Time in Eternity* (*PSCF* 65, no. 2 [2013]: 135–7). It appears that I confuse light cones with inertial frames of reference in the review at the bottom of p. 136 and top of p. 137, an error Russell was kind enough to point out. In fact, in shortening the word-count of an earlier draft, I deleted a key point necessary to understand the paragraph in question. Here is that point, which, I emphasize, is my interpretation of Russell's view.

His argument for an ontological and inhomogeneous past-present-future structure ("ppf") within a light cone logically entails that, mutatis mutandis, *more than that single light cone has the same ppf structure*. Call the event at the center of the given light cone "Q." When Q is present, any event which is simultaneous *within Q's inertial frame of reference*, will also be at the center of a light cone with the same or very similar ppf. (This assumes a standard simplification in general relativity, viz. that for an inertial frame of reference one ignores the negligible curvature of space-time within the frame.) Events in the same inertial frame will have approximately the same temporal metric, and so also ppf relations. And this would spread Q's ppf structure beyond one light cone to those in its frame.

This proposed interpretation is missing from the text, and it explains the way I wrote the offending paragraph. I do own the error in the draft I submitted, and apologize to the author, and to the readers and editors of *PCSF*, for making it.

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