ANTHROPOLOGY & ARCHEOLOGY

DON'T SLEEP, THERE ARE SNAKES: Life and Language in the Amazonian Jungle by Daniel L. Everett. New York: Pantheon Books, 2008. xviii + 283 pages, plus eight pages of colored plates. Hardcover; $26.95. ISBN: 9780375425028.

This agreeably written account of life among the Pirahã Indians of Brazil is really three books in one. Missionary-linguist-turned-linguist Daniel L. Everett plaits together an account of his life as a North American family man trying to make a go of things in Amazonia, as a linguist whose paradigm-shaking data have sent ripples throughout and beyond linguistics, and as a missionary who experienced a crisis of faith and walked away from Christianity.

Anyone who has had an experience like Everett's attempt to take care of himself and his family in a world that he had never known before, will connect with the adjustments that he made. Everett is self-effacing as he relates his naivete about living in the Amazon, and the effortless prose of the descriptions easily evokes the reader's own analogous anecdotes. Some of the narrative is amusing, as when he sought to eliminate all non-human forms of life from his workspace (a Quixotic notion in the tropics). At other times, Everett's tone is somber and panicked, as when he struggled to evacuate his wife Keren, who was suffering from a serious bout with malaria.

If there is a single *raison d'être* for this book, it would have to be the second strand: Everett's saga of discovery of the theory-busting Pirahã language. To put things simply, the Pirahã language lacks elements that linguists had long believed were universal, such as concepts of numbers, adjectives, and the ostensible *sine qua non* of language, recursion. Recursion, simply put, is what allows languages to use embedding to increase the complexity of sentences, as in

> The dog bit the letter carrier.
>
> The dog that I saw bit the letter carrier.
>
> The dog that I saw bit the letter carrier who is new to the route.
>
> The dog that I saw out of the corner of my eye bit the letter carrier who is new to the route because of a retirement.

Contemporary linguistic theory is dominated by—but not restricted to—the ideas of Noam Chomsky who claims that the forms of all human languages are the result of a rather sophisticated feature of the human mind, what Steven Pinker calls the "Language Instinct." Recursion is part of this instinct, or it is supposed to be, and Everett spent years trying to find evidence of this feature before he began to wonder if the shortcoming was not his but that of Chomsky's theory.

We find that Everett was put into the difficult position of having to demonstrate the absence of something. He describes how he wrestled with data and theory, and how he came to conclude that among the Pirahã, a cultural value reduces or eliminates the utility of recursion as a linguistic feature; in other words, culture "impinges on grammar and language in nontrivial ways" (p. 210). This Pirahã cultural value is what Everett refers to as the Immediacy of Experience Principle (IEP). The IEP means that the Pirahã disregard phenomena that are not directly observed (phenomena experienced in dreams qualify as lived experience, by the way). The gist of Everett's claim is that the "shortcomings" of the Pirahã language (for example, no numbers, no adjectives, no recursion) are seen as dependent variables, caused by the IEP. Linguistic forms as dependent variables turn much of the received wisdom of linguistics on its head.

The lack of adjectives in Pirahã presents a clear illustration of Everett's explanation. If I refer to a shirt as "blue," it implies that I am familiar with the larger set of shirts in the world, some of which are blue and some of which are not blue. This generalization is not, of course, grounded in my familiarity with shirts—I have seen only a subset of the world's shirts. But to a Pirahã speaker, to refer to a shirt as "blue" is conceptually—and therefore linguistically—out of bounds since calling a shirt "blue" puts a shirt into a conceptual class in which not all members are known.

Likewise, to refer to "three arrows" wrongly implies that one is familiar with *all* things that share the characteristic of "three-ness." In the example of embedded clauses above, the embedded bit "I saw" in the sentence "The dog that I saw bit the letter carrier" does not work in Pirahã because it implies that I am familiar with all dogs—seen and unseen by me—and, of course, I am not.

Everett does an admirable job of helping the reader through some of the theoretical linguistics that he has to bring in. His synopsis of Ferdinand de Saussure (pp. 198–9) is as good a two-page recap as one will see anywhere. And the set of color portraits of some Pirahã individuals and small groups by photographer Martin Schoeller are striking.

There are, however, two significant drawbacks of the book. The first is the lack of an index, a weakness that reduces the book's utility for classroom use. The second is that if Everett's argument is that culture "constrains" language (p. 236), then the concept of *culture* should receive considerable attention. It does not.

These reservations aside, this is an enjoyable book, with something for everyone, from linguistic neophyte to theory aficionado. It is worth noting that some discomfort is not impossible for the Christian reader because of the third story: Everett's rejection of the faith he once spoke for. This renunciation—if that is the best word for it—is grounded in the Pirahãs' lack of interest in the Christian message as well as Everett's own sense that they did not need it. The parallels in Everett's iconoclasm are striking: increasing familiarity with the Pirahã results in the rejection of orthodoxy in both linguistics and Christianity. They need recursion no more than they need Jesus, Everett seems to argue, and if they do not, then claims of the universal value of linguistic and Christian orthodoxy are empty.

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ETHICS

A SHARED MORALITY: A Narrative Defense of Natural Law Ethics by Craig A. Boyd. Grand Rapids, MI: Brazos, 2007. 272 pages. Paperback; $26.99. ISBN: 9781587431623.

RETRIEVING THE NATURAL LAW: A Return to Moral First Things by J. Daryl Charles. Grand Rapids, MI: Eerdmans, 2008. 346 pages. Paperback; $34.00. ISBN: 9780802825940.

Charles and Boyd both advocate natural law, but for substantially different purposes. For Charles, "natural law thinking will determine our ability to relate to and address surrounding culture" (p. 23). Since all people of goodwill can discern certain basic goods as important to human flourishing, awareness of this natural law allows Christians and non-Christians to engage in moral conversation. Granted, even if there is agreement on what helps human beings to flourish, there is still discussion about which good has the greatest weight in a given situation and how it can best be achieved.

In contrast, while Boyd also sees by natural law an awareness of basic moral norms available to all people, he is more reserved about how much natural law can offer apart from its formative dependence on Christian revelation. Sin has corrupted our apprehension of the natural law, and even if the natural law is to some extent seen by those outside the faith, why should one feel any obligation to follow nature unless one is yielded to nature's designer? Boyd sees attempts beginning with Grotius and continuing to the present day of appealing to natural law as an autonomous secular theory, as fundamentally incomplete. But when natural law is grounded and shaped for Christians by knowing the lawgiver and having godly virtues, the natural law can help guide the Christian life. Boyd credits Protestant pietism with shaping people of virtue who can then better see and live the natural law. In contrast, Charles singles out Protestant pietism for rebuke as too separatist and sin oriented to use natural law effectively in public life.

Charles has a lively, but often dismissive, tone. Authors praised and disparaged match closely the heroes and villains of the journal *First Things*. It is not surprising, and indeed it is fitting, that the phrase "first things" appears in the book title. Charles is a professor at the evangelical Union University in Tennessee and appears to be part of the evangelical movement that has found common cause in bioethics with traditional Roman Catholicism. Most of his quotations and praise are for Roman Catholic thinkers from Thomas Aquinas to John Paul II. The three chapters of the book devoted to applying natural law build from the papal encyclical *Evangelium Vitae*.

Boyd, a professor of philosophy and faith integration at Azusa Pacific University, who completed his doctorate at the Jesuit St. Louis University, critiques incisively ethics associated with sociobiology, divine command theory, postmodern relativism, and analytic moral philosophy. As he tests each view, he looks for understanding and finds insights. Finally, it is virtue theory that he aligns closely with natural law. Natural law offers needed guidance for shaping virtue, and virtue makes natural law livable.

Natural law has twenty centuries of champions adapting it to speak to the personal and social challenges of their times. Both Boyd and Charles know the challenges of our time and offer versions of natural law to help meet them.

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HEALTH & MEDICINE

MEDICINE, RELIGION, AND HEALTH: Where Science and Spirituality Meet by Harold G. Koenig, MD. West Conshohocken, PA: Templeton Foundation Press, 2008. 234 pages, appendix, notes, index. Paperback; $17.95. IBSN: 9781599471419.

Increasing attention has been drawn to the spiritual aspects of patients. This has included studies that explore the role of spirituality and/or religion in both patient care and human health. In *Medicine, Religion, and Health*, Harold Koenig has taken on a difficult task. He has attempted sweeping reviews of several investigative areas that look for correlations between aspects of spirituality and/or religion and various health outcomes. These topics involve a large, complex, and heterogeneous medical literature where the studies vary widely in quality and interpretability.

Koenig's overarching objective is to convince the reader that religion and spirituality can influence health "in a scientifically detectable way" (p. 4). A second formulation of this thesis more specifically states that "psychological, social, and religious aspects of human life can be shown to affect the physical body." He believes that there are aspects of religion and spirituality that are amenable to scientific scrutiny and so can act as "natural" indicators for assessing the impact of religion and spirituality on health. To this end, the bulk of the book is organized according to six areas of physical health: immune and endocrine functions, cardiovascular function, stress and behavior-related disease, mortality, physical disability, and measurable manifestations of mental health.

Koenig begins by presenting his definitions of religion and spirituality. The former he clearly defines as beliefs and practices that involve a relationship with a supernatural being and that are expressed in a community of like believers. Religion is multidimensional, measurable, and quantifiable. However, in the studies that he reviews, the concept of religion is often reduced to single manifestations of religious expression such as worship attendance, belief in an afterlife, or the number of times that Scripture is read per week. This makes his generalizations of the results regarding religion, as a whole, tenuous. His research definition of spirituality includes a "personal relationship to the transcendent" that is rooted in a tradition. His description of tradition is distinctly Christian. Koenig does not make it clear whether he only uses this definition in his own studies or whether he selected for review only the studies that met his definition.

The applicability of the results of his reviews to practice will be more difficult if multiple concepts of spirituality are included in those reviews.

Koenig's stated research method is to review published research in mainstream journals that address the area of physical health. One could call his method a *narrative* review, since it lacks the depth of detail that characterizes most contemporary systematic reviews in medicine. The science of systematic reviews, which includes meta-analysis, has become increasingly rigorous in recent years, with requisite disclosure of considerable methodological detail. Koenig's reviews do not exhibit this rigor. He generally presents the results of his analyses as proportions of positive versus negative study results. While he rightly informs the reader that high quality, randomized trials minimize bias and confounding factors, he does not seem to give greater weight to such studies in his collective interpretations of study results. He does not divulge the criteria for his selection of studies for review, nor does he provide details on the quality of the design, implementation, and analysis of specific studies. No effort has been given to extract data from each study and to combine these data into a true, fresh meta-analysis of all the data from which a "meta-result" could be derived. For example, in the chapter on studies of mental health outcomes, he mentions that five of eight randomized trials showed faster recovery from depression using religious-based interventions compared to secular ones. But he provides no details as to the nature of the interventions used and gives no indicators of the degree of confidence in the results of each study based on their statistical rigor and on the successful implementation of each study as originally planned.

Koenig's consistent conclusion for each area is that the evidence seems to favor various positive health outcomes for those who exercise various practices that are considered religious or spiritual in nature. This may well reflect true positive associations or even causality in some cases, but not giving more weight to results from better quality studies is regrettable. Greater confidence in the results of the studies with negative results would clearly affect the interpretation of the summary result. More attention should have been made to the quality than to the quantity of studies.

There is a need for more and better studies in this area, in order to determine what areas of religion and spirituality can and should be studied (e.g., can/should prayer be studied using scientific methods?) and to prioritize such studies according to clinical need. Researchers could then devise and employ methods appropriate for answering the most pressing questions. Such increased scientific discretion and rigor could help us to identify and apply better interventions and counseling strategies to the spiritual needs of patients.

Koenig's chapter on clinical applicability provides some very helpful suggestions for broaching the issue of spiritual support when seeing patients in clinic or hospital settings. These include the consideration of certain clinical instruments when taking a history of spiritual awareness and need. He demonstrates persuasively that holistic health and spiritual care depend upon the varied roles of chaplains, physicians, and nurses, working along with family, friends, and community. Overall, aside from the methodological deficits observed above, this book provides a good snapshot of a long-neglected and important area of medicine that is of particular interest to many Christians and non-Christians alike.

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HISTORY OF SCIENCE

H. G. BRONN, ERNST HAECKEL, AND THE ORIGINS OF GERMAN DARWINISM: A Study in Translation and Transformation by Sander Gliboff. Cambridge, MA: The MIT Press, 2008. xii + 259 pages, notes, bibliography, index. Hardcover; $35.00. ISBN: 9780262072939.

Just as the first century CE saw no one "pure" Jewish or Christian faith, but multiple Judaisms and Jesus movements, so the nineteenth century saw varieties of evolutionary theories, including different Darwinisms. Sander Gliboff's study is a fresh, well-written, well-researched, and well-argued contribution to the historiography of how Darwin's ideas were introduced, understood, altered, and applied in various national contexts. Gliboff not only breaks new ground in our historical and theoretical understanding of Ernst Haeckel's role in the German assimilation of Darwin (Haeckel's work hugely outsold his intellectual master's), but he also examines the work of Germany's preeminent paleontologist Heinrich Georg Bronn, the person through whom Darwin's *The Origin of Species* first reached its German-speaking readership.

Darwin's own version of evolution (the transmutation of species or descent-with-modification-from-a-common-ancestor-mainly-but-not-exclusively-by-means-of-natural-selection) was centrifugal from the start, as his correspondence, notebooks, drafts, and revised editions of *The Origin* all show. It is well known that selectionism was revised (or watered down, depending on one's perspective) as Darwin made more room in his theory for ideas drawn from Buffon, Lamarck, and others. Remarkable too were the multiple and even incompatible responses of Darwin's readers. Allies and critics, from Thomas Henry Huxley to Samuel Wilberforce, from Baden Powell to George Frederick Wright, from Asa Gray to St. George Mivart, from Alfred Russel Wallace to Aubrey Moore, from George Romanes to William Dawson (to mention but a few) read Darwin in divergent and even unexpected ways. Huxley was skeptical about his friend's gradualism, for instance, and regarded natural selection as a provisional, not yet proven mechanism; Wilberforce accepted natural selection, while offering critiques of evolution more scientific than theological. And that is just a small slice of responses in the English-speaking world. Problems of interpretation mushroomed with the translation of Darwinism into different languages and cultures.

Translation—as we all know from reading different versions of the Bible, if not from personal bilingual experience—is not an exact and mechanical transfer of unambiguous fact, feeling, and meaning between two languages. It can be like a conversation between friends, or lovers, or siblings, or strangers. It can as bad as someone like me, with a tin ear, trying to transcribe what was

heard at a live performance of Gabriel Fauré's *Requiem.* Or it can be as good as a trained musician doing the same thing. Much depends on the context, the communicator, and the quality of connection. Much can be missed. And much can be added that was merely implicit, or even absent from the source text. In other words, translation is a kind of interpretation.

Texts are not simply read, they require interpretation, and every interpretation or critical stance carries with it some ideological baggage or personal bias. No interpretation or theory is purely objective or free of philosophical assumption; none is disinterested. According to postmodern hermeneutics, every interpretation is local and particular, and decisively shaped by social and intellectual context. (Traditional theories of interpretation too have long recognized that in the process of textual translation, meanings can be transformed.) And this possibility is increased when the translator acts consciously and explicitly as an interpreter, as was the case with Bronn (1800–1862), who published Darwin's *Ûber die Entstehung der Arten* in 1860 along with his own notes and commentary, making him a kind of partner in Darwin's project even as interests other than Darwin's ended up being served.

Ernst Haeckel (1834–1919) is known even to casual students of the history of Darwinism for those notorious drawings illustrating his "biogenetic law," a revival of the claim that the anatomical features of modern embryos represent key prior stages of our species' evolutionary past: "ontogeny recapitulates phylogeny" as we used to say. Advocates of Intelligent Design and anti-evolution creationists will be aware of "Haeckel's Embryos," chapter five in Jonathan Wells's *Icons of Evolution: Science or Myth?* (Washington, DC: Regnery [2000], 81–109, with notes at pp. 285–93). And many will remember him as Darwin's leading champion in Germany, as an immensely popular anti-theistic and proto-Nazi philosopher, or as the popularizer of the idea of a "missing link" between apes and humans.

Many with an interest in how Darwinian thought came to be transplanted into a German context will be familiar with such English-language texts as Daniel Gasman's *The Scientific Origins of National Socialism: Social Darwinism in Ernst Haeckel and the Monist League* (New York: American Elsevier, 1971) and his *Haeckel's Monism and the Birth of Fascist Ideology* (New York: Peter Lang, 1997); Frederick Gregory's *Scientific Materialism in Nineteenth Century Germany* (Dordrecht: D. Reidel, 1977); Alfred Kelly's *The Descent of Darwin: The Popularization of Darwinism in Germany, 1860–1914* (Chapel Hill: University of North Carolina Press, 1981); William Montgomery's chapter on Germany, pp. 81–116 in Thomas F. Glick, ed., *The Comparative Reception of Darwinism* (Chicago: University of Chicago Press, 1988 [University of Texas Press, 1974]); Paul Weindling's essay "Ernst Haeckel, Darwinismus and the Secularization of Nature," pp. 311–27 in James R. Moore, ed., *History, Humanity, and Evolution: Essays for John C. Greene* (Cambridge: Cambridge University Press, 1989); Richard Weikart's *From Darwin to Hitler: Evolutionary Ethics, Eugenics, and Racism in Germany* (New York: Palgrave Macmillan, 2004); and Mario Di Gregorio's *From Here to Eternity: Ernst Haeckel and Scientific Faith* (Göttingen: Vandenhoeck und Ruprecht, 2005).

All of the above need now to be re-read and revised in light of two recent studies, Robert J. Richards's magisterial work of rehabilitation, *The Tragic Sense of Life: Ernst Haeckel and the Struggle over Evolutionary Thought* (Chicago: University of Chicago Press, 2008) and the book under review, Gliboff's splendid and nuanced account of the origins of German Darwinism.

In his Introduction—one of the most interesting I have read in a long time—Gliboff explains how it was that Bronn, whose work in the 1840s and 1850s in some ways paralleled that of Darwin, came to translate *The Origin*. Both men sought to explain "the developmental laws of the organic world" (as the title of an 1858 monograph by Bronn put it), and both used the other as authorities in their own work. Both appreciated the appearance of design in nature, even as both sought naturalistic explanations for what they observed. Bronn, however, was a geological rather than biological evolutionist. And differing theoretical commitments represented only one more among other sources of the translation problems faced by Bronn.

In their correspondence (1859–1862) and in Bronn's version of *The Origin*, Gliboff uncovers evidence of negotiation and miscommunication, as well as mutual understanding. There were legitimate questions of technical—scientific and linguistic—meaning. "Natural selection," for instance, was an infamously problematic expression open to varying interpretations, as Darwin was dismayed to discover. How did the old German morphological term *Vervollkommnung* (perfection, or progress toward it) relate to Darwin's use of words such as "progress" and "perfection"? Ideas, and the words employed to express them in their various contexts, have dynamic histories and trajectories. How should "adaptation," "variation," and "selection" best be rendered into German? How could Bronn best capture Darwin's novel or ambiguous uses of well-known words? Gliboff discusses pre-*Origin* German transcendental morphology, including analogies of embryological development with the succession of species found in the fossil record. He introduces how ideal archetypes were, post-*Origin*, turned into biological ancestors. And he shows how Bronn and Darwin were partners in the work of redefining scientific terminology.

Haeckel, we all knew, used Darwinism to transform German biology (morphology, paleontology, taxonomy, and more) as a foundation for philosophical, social, and political reform. Gliboff closes his Introduction by sharply critiquing earlier historians' collectively contradictory views of Haeckel as an anti-Catholic Monist, a Lamarckian, a determinist, an indeterminist, a materialist, an idealist, an advocate of Romantic *Naturphilosophie,* a Darwinist, a pseudo-Darwinist, and, at best, a minor historical curiosity. Haeckel instead is revealed by Gliboff to have been a key participant with Bronn (from whom he learned his Darwin) in a revolutionizing project to re-conceive the sciences of life.

Having situated his main characters in a new narrative, Gliboff proceeds to provide the fine details of the difference Darwinism made in Germany. Chapter One revises our understanding of "The Sciences of Life at the Turn of the Nineteenth Century," that is, before Darwin. Chapter Two, "H. G. Bronn and the History of Nature," serves as an excellent introduction to a scientist too little

known outside specialist circles. "Darwin's *Origin*" is the title of Chapter Three, and even specialists will learn from Gliboff's subtle account of the origins, argument, and early responses to Darwin's book. Readers of this journal will be particularly interested in what Gliboff has to say about how Paley's understanding of chance, law, and design affected Darwin's. A careful and illuminating analysis of "Bronn's *Origin*" (his 1860 edition based on Darwin's second, and the posthumous 1863 edition based on Darwin's third) is the subject of Chapter Four. Gliboff rescues the German translation from its unfair "reputation for inaccuracy and distortion" (p. 123). Chapter Five, "Ernst Haeckel as a Darwinian Reformer," is a concise account of the work of a polemical and controversial figure who has been caricatured and condescended to by historians and those offended by his anti-providential and nonteleological interpretation of evolution (among other things). Gliboff succeeds in clarifying Haeckel's views, including his defense of the inheritance of acquired characteristics—which Darwin, remember, accepted as a source of variation—and his rejection of August Weismann's germplasm theory of heredity. In his Conclusion, Gliboff reflects on the changing meanings of "Darwinism" in history—a history complex enough to include the versions of Bronn and Haeckel, a theory thick with multiple uses, meanings, and implications—past, present, and future.

Impressively grounded in the primary sources, and with a keen critical eye on the secondary literature, Gliboff's superb and accessible study is highly recommended for everyone with a serious interest in the history of evolution.

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NATURAL SCIENCES

FURNACE OF CREATION, CRADLE OF DESTRUCTION: A Journey to the Birthplace of Earthquakes, Volcanoes, and Tsunamis by Roy Chester. New York: Amacom Books, 2008. xi + 242 pages. Paperback; $24.96. ISBN: 9780814409206.

The majority of this volume is a solid, reasonably accessible overview of the geology that underlies earthquakes, tsunamis, volcanoes, and related phenomena. Several major recent events get particular attention, especially the tsunami of December 2004. There is a lot of attention paid to the human element, so that it could be useful to ministries thinking about disaster preparedness and emergency response.

The book begins, however, with a discussion of historical developments in understanding how the earth works, especially earthquakes and plate tectonics. Unfortunately, this section is rich in science-religion warfare clichés. No matter what the actual theological views of the persons involved, the events are billed as the progress of science and reason against religion and superstition. No matter that many of the early ideas were presented in a clearly religious context—Chester's grasp of Christianity is on par with Richard Dawkins'. Nevertheless, if one ignores the warfare clichés, there is a good review of the major players and events involved in building our modern understanding of how the earth works. Thus, it is a good geology book, but not such a good history book. The book does not have a bibliography or footnotes, but many important publications are cited by author, title, and date in the text, so that a determined reader could track down sources.

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SCIENCE TALK: Changing Notions of Science in American Culture by Daniel Patrick Thurs. New Brunswick, NJ: Rutgers University Press, 2007. 237 pages, index. Hardcover; $44.95. ISBN: 9780813540733.

Founding father John Adams wrote to J. H. Tiffany in March of 1819: "Abuse of words has been the great instrument of sophistry and chicanery, of party, faction, and division of society." The importance of words and their associated meanings was not lost on the Hebrews or on other people in the ancient Near East (and by inference for all those for whom words matter greatly). Jews, Christians and Moslems have always been known as people of the Book.

This interesting volume explores the varied meanings of the word "science" in American culture over the past two centuries. "Science" is an ancient word that has only in modern times been associated with a distinct manner of beholding the world and seeking to ascertain its workings. It is also a word that prompts much reflection, refraction, and reaction. Daniel Thurs seeks to situate the word "science" in its cultural and social contexts, using the lens of the history of science and the manner in which the general public and leading intellectuals have interacted with those who claim to be "scientists." Thurs earned a Ph.D. in the history of science at the University of Wisconsin-Madison in 2004 and concluded a postdoc at Cornell University where he tracked public discussion of nanotechnology. He is presently a member of the faculty in the interdisciplinary master's program in humanities and social thought at New York University.

The puzzle which the author seeks to unravel is why the nation with the largest, most robust scientific enterprise in history has such an ambivalent, even love-hate relationship (my words) with science. He searches for an answer in what he helpfully calls "science talk," namely, how scientists themselves (or those claiming to be scientists) describe what they do, and similarly, how non-scientists describe what science is and what it is that scientists do. Thurs views science as a keyword in understanding American culture and agrees with the noted jurist Oliver Wendell Holmes that "A word is not a crystal, transparent and unchanged; it is the skin of a living thought and may vary greatly in color and content according to the circumstances and the time in which it is used" (p. 6).

Discourse analysis is his chosen method of analysis. Thurs applies it skillfully in a series of five well-chosen, historical vignettes, each of which takes up one chapter: phrenology (a science for everyone), evolution (struggling over science), relativity (a science set apart), UFOs (in the shadow of science), and Intelligent Design (the

evolution of science talk). Each chapter has a similar format in which key representatives from the debate are featured. These persons are drawn from popular periodical literature, popular books, and other quotable sources that have formed and influenced public discourse about the nature of science and its relationship to the subject at hand. Each quotation is carefully footnoted, and my own familiarity with four of the five topics leads me to think that Thurs has been judicious in his choices—even if one might disagree with some of his conclusions. He deliberately chose these five examples because they illustrate the complex relationship among scientific claims, scientific disclaimers, persons who merit the moniker of "scientist," the tricky business of demarcating science from other forms of knowledge, public perception of the scientific enterprise which is shaped by public discourse, and a host of other important factors all too frequently overlooked.

The chapters build upon one another to generate an elaborate argument about how the meaning associated with the word "science" has changed in American popular culture. Thurs argues that this public talk is fundamental in understanding America's continuing discomfort with science. Scientists themselves also figure prominently in his presentation and analysis. In fact, he finds scientists as much to blame for current impasses as are members of the general public and public intellectuals: "a science more easily set apart has also been a science more easily set aside; greater distinctness has created novel possibilities for subversion and containment as well as celebration" (p. 3).

Thurs pleads for a more careful and fuller engagement with popular culture from the scientific community. If the goal is clarity and a better understanding of the scientific enterprise, scientists will need to substantially alter their speech to engage the public. This is not because of the impenetrability of science itself, but because of the important role that language, words, meaning, and discourse play in the process. Thurs pleads for all parties to listen more carefully, engage more thoughtfully, exercise more patience, and recognize that none of us can escape our own cultural milieu or the many nonscientific factors that enter into such a discussion. This is a finely nuanced, rich text from which we can learn to think anew about the science and Christianity dialogue, especially in its present representation in American culture.

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PHILOSOPHY & THEOLOGY

EVOLUTION AND EMERGENCE: Systems, Organisms, Persons by Nancey Murphy and William R. Stoeger, eds. New York: Oxford University Press, 2007. 360 pages. Hardcover; $110.00. ISBN: 9780199204717.

One might wonder why emergence is drawing so much attention from scholars across a number of disciplines. Perhaps theologians, computer scientists, biologists, and sociologists are all intrigued by emergence because it depicts a common human experience. These experiences are typically routine, but can also provoke in us a sense of wonder and bewilderment. While chemical reactions, organism organization, and human social behaviors are clearly different, a common logic is inherent to each. That is, at a basic stage, each exhibits a special relationship between parts and a whole. Examples that take these unique parts to whole relationships are all around us. Some would even argue that as you read this sentence an instance of emergence is occurring. Simply put, the parts in your brain (neurons) are interacting in a specific way, giving rise to the whole (ideas) necessary to comprehend this sentence. In addition, the very sentence forms a complex of parts and wholes on several different levels. That common experience is the impetus for exploring emergentism. In *Evolution and Emergence*, the various essays seek to move emergentism beyond mere phenomenological alignment toward a legitimate explanatory option.

This book, edited by Nancey Murphy and William R. Stoeger, offers a collection of essays from philosophers, scientists, and theologians on the topic of emergent evolution. Fittingly, the book's three sections deal with philosophy, science, and theology.

The first section deals with philosophical notions of emergence. The article contributed by Nancey Murphy continues an argument she has made for years. In her view, emergence should be favored over reductionism due to the reality of downward causation exhibited by complex systems. Murphy's chapter is followed by two chapters from Robert Van Gulick. His first chapter is a summary of the primary reductionist, nonreductionist, and emergentist options available in the philosophy of mind. His second chapter addresses the difficult issue of mental causation and its possible reality.

In the final chapter of this section, Terrence Deacon notes that moving from mechanism to teleology requires a massive ontological jump. Instead of trying to reduce phenomenology to physics or to show them to be ultimately incommensurable, he focuses on the possibility that a mediating domain of causal dynamics can fill this gap. To serve this role, he looks to processes in which form generation and propagation are more prominent than either simple mechanistic/thermodynamic processes or fully teleological processes. For Deacon, this means exploring the dynamics of emergence as a naturalistic or "bottom-up" process, much the way other scientific explanations are understood. From this perspective, Deacon strives to demonstrate how semiotic processes—which provide the framework for dealing with such human dilemmas as intention, desire, meaning, and even morality—are both physical processes in every sense of the word and yet can exhibit a causal character that appears to run counter to the most basic tendencies characteristic of other simpler physical processes. Deacon's central contribution is to precisely identify two fundamental inflection points where such fundamental symmetry breaking occurs in dynamic processes of increasing complexity and thus where the apparent "directionality" of causal dynamics diverge. The first inflection point leads to a dynamic dominated by formal rather than energetic relationships (morphodynamics), and the second leads to a dynamic dominated by represented ends and functions rather than mere forms (teleodynamics).

Scientific topics are covered in the second section. Working with the assumption that physics is not a complete explanatory schema, George Ellis adopts emergence as a way to assess causation and existence. Don Howard's chapter walks the reader through an assessment of the relationship between particle physics and condensed matter. He urges us to not be hasty in characterizing this relationship as emergent. Martinez Hewlett discusses the origin and complexity of life as a biological example of the need for "higher-order" explanatory models. The chapter from Alwyn Scott delves into the nature of nonlinear phenomena and their role in what he calls the "cognitive hierarchy."

Warren Brown's chapter describes a "bare bones" outline of a robust model for mental causation. The structure of this model includes a look at several challenging issues, including the nature of learning, the function of action loops, and symbolic representation, among others. His primary claim is that the best way to establish mental causation is to acknowledge that "mind is embodied and embedded in action in the world." By affirming embodied mind, Brown is a physicalist. With the mind embedded in action, he is a proponent of mental causation. Along these lines, Brown's use of emergence is not one of radical discontinuity between mental functions in humans and those in nonhuman animals; instead, he blurs this continuum. It is not that human mental causation is merely quantitatively different from other animals. The emergence of symbolic abilities and language allow for a qualitative difference as well—again, not in any discontinuous sense (human mental abilities find their precursors in our nonhuman relatives). Brown's efforts to establish downward/mental causation is laudable, but many questions remain: Does mental causation operate via efficient causes? If so, how? If not, what kind of cause is it? As an admittedly "bare bones" attempt, Brown's is an intriguing first step.

In section three, we move to theological chapters. William R. Stoeger has contributed an article that assesses the intricate relationship between emergence and reductionism. This interaction, he believes, offers a valuable resource for the wider interaction between theology and science, generally, and issues on divine and human action, specifically. Arthur Peacocke continues an argument he has made consistently for some time now. He believes that the picture of reality set forth through emergence is monistic and hierarchical—features that allow theologians purchase with regards to whole-part causation. Niels Henrik Gregersen explores artificial life as a possible resource for theologians with its emphasis on novelty, its attention to the actual and possible, and its awareness of the emergence of autopoietic systems—all of which have religious and theological repercussions. The final chapter of the volume is Philip Clayton's preliminary attempt to construct a Christian theology of emergence.

Catholic theologian John Haught's chapter describes and assesses the insufficiency of "scientific naturalism." For him, this position is exemplified by two commitments: first, there is nothing beyond nature, and second, the natural sciences are touted as the only accurate explanatory schema for dealing with this reality. Haught believes this "scientistic" view is fatally flawed because it ignores or dismisses the reality of subjective experiences which are clearly part of the natural world. Emergence provides Haught the means for affirming novelty, striving, and subjectivity as real and irreducible aspects of the world. Following the work of Alfred North Whitehead, Bernard Lonergan, Michael Polanyi, and Pierre Teilhard de Chardin, Haught argues for a "richer empiricism" that takes seriously "*the widest possible range of what we actually experience in the world*" (emphasis in original). There is certainly a type of naturalism that fits the model Haught has developed here, but naturalism is not the problem. Instead, it is the eliminative approach that some take—either reducing to "basic" particles or inflating to subjective ideals. Emergence is not a rigorous position because it eliminates reduction, but because it establishes a middle ground between the physicist and phenomenologist.

Overall, this is a helpful addition to the study of emergence. Several of the articles may be a bit challenging for the nonscientific reader, but the struggle is worth overcoming. Oddly, Oxford recently published another book that shares a very similar structure—and even several of the authors (see Philip Clayton and Paul Davies, eds., *The Re-Emergence of Emergence*, 2006). While there are differences between these texts, the exuberant price of each will likely prevent one from purchasing both. Either text will have a similar result: a thorough introduction to the topic of emergence from diverse perspectives.

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Religion & Biblical Studies

MISSION IN THE 21ST CENTURY: Exploring the Five Marks of Global Mission by Andrew Walls and Cathy Ross, eds. Maryknoll, NY: Orbis Books, 2008. 219 pages. Paperback; $25.00. ISBN: 9781570757730.

Science is a worldwide endeavor. We have become accustomed to people and ideas crisscrossing the continents. The Christian faith is increasingly interconnected across the globe as well. Barrett and Johnson estimate that two centuries ago less than five percent of the Christians in the world lived outside Europe and North America. They estimate that today sixty-five percent of Christians live outside Europe and North America. Given that increase outside of traditional centers, the mission outreach that has always been part of the Christian faith is no longer just north to south or west to east. The largest church in Kiev, Ukraine, has twenty thousand members and was founded by a Nigerian. The second-largest sender of missionaries in the world is now Korea. With Christianity a global movement, mission can be from every corner to every corner.

This anthology exemplifies that development. Nineteen chapter contributors from six continents are brought together to describe how the mission of the church is perceived and practiced worldwide. The book contains articulate voices, not only from the USA and the UK, but also from Nigeria, Sierra Leone, Uganda, Ghana, Kenya, South Africa, New Zealand, Brazil, India, Korea, Japan, China, and the Philippines. The authors are con-

necting life in the historic Christian faith with strikingly different contexts. That offers "a glimpse into how other people follow Jesus in their contexts and listen and learn from other travelers along the way."

Speaking from a plethora of fellowships and places, Part One is organized to address the five marks of mission stated by an Anglican Consultative Council in 1990. Those are to (1) proclaim the Good News of the Kingdom; (2) teach, baptize, and nurture new believers; (3) respond to human need by loving service; (4) seek to transform unjust structures of society; and (5) strive to safeguard the integrity of creation. This framework and two authors addressing each mark lend the anthology significant coherence even as it treasures a diversity of perspectives. Part Two focuses on seven issues for modern missions. Those include, for example, one chapter on the formative role of international migration and another on worship as a point of outreach. Each chapter is insightful, although footnotes (rather than book endnotes) and an index would have added to the utility of both Part One and Part Two.

As the Archbishop of Canterbury writes in the preface, "We see more and more of [the Word's] depths as we see more and more of what it does in diverse lives and worlds." *Mission in the Twenty-First Century* exemplifies the worldwide conversation and shared commission of the Christian faith. We have much to learn from each other and much to do together.

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RELIGION & SCIENCE

BACK TO DARWIN: A Richer Account of Evolution by John B. Cobb Jr., ed. Grand Rapids, MI: Wm B. Eerdmans Publishing Co., 2008. 434 pages. Paperback; $36.00. ISBN: 9780802848376.

The book emerged from a conference on process theology, evolution, and religion. Editor John Cobb Jr. is an expert on Whiteheadian process theology. He has drawn together like-minded contributors who regard this world as reflecting an intelligent purpose. They accept the theory of evolution and humanity's shared, common ancestry with other species, but some contributors questioned the exclusion of subjectivity from science. There are four major sections in the book with an introductory preface to each by the editor. In Section II, Cobb evaluates the alternatives to Darwinism.

The contributors aim to demonstrate a role for God in creation by integrating science and theology. A major thesis of the book is that the radical denial of any role for God in evolution is the consequence of the metaphysics closely associated with, but not required by, science. The contributors introduce Whiteheadian philosophical ideas into the dialogue between evolution and science, an alternative that moves away from issues that have been debated over the last one hundred years. They claim that thoughts provide a better explanation than the mechanistic and materialistic concepts often now employed in science. Life is bound up with an urge to live, and organisms aim to live well and to live even better. Because science is objective, it appears uninterested in considering subjective matters. Yet complex forms of subjectivity have emerged from very simple ones. These writers show that science without subjectivity presents an inadequate explanation of the wonderful world in which we, evolved hominids, live; we are a part of this evolving creation.

Biologist Francis Ayala presents several excellent articles, emphasizing that there is no need to have to choose between evolution and God. He represents a neo-Darwinist approach to biology and agrees that science should have an objective view of the world and Christians should reconcile their faith and science. He sees the need to connect with believers in the church pews if the concepts of science are to change the beliefs of "creationists," because these Christians should see evolution as an ally. He says that scientific knowledge is highly significant in Western cultures as it concerns itself with relationships and the systematic organization of knowledge.

In chapter 3, Ayala examines the idea of reductive thinking as applied to organisms and explores the relationship between the whole and its component parts. He expands his ideas in chapter 4 regarding the frontiers in biology, from egg to adult, brain to mind, and hominid transformation to humans, including the relevance of the FOXP2 DNA sequence and speech. He postulates that morality could be a by-product of other adaptive cognitive capacities. Ayala is firm in maintaining that an expanded neo-Darwinism could explain the biota. He maintains that process theology in cosmic history is concerned with a broad directionality and teleology and not in a detailed preordained goal, where the future is unpredictable and never inevitable, where God leaves alternatives open, for God is a God of persuasion and not of coercion.

Biologist Jeffrey Schloss presents an excellent paper on the current status of Darwinism. Pete Gunter, a process theologian, assesses the evidence relating to neo-Lamarkianism. Many studies have demonstrated that organisms may acquire genes from other organisms, and behavior does affect genes. This Baldwin effect, affecting the phenotype of an organism, is also discussed in other articles in this book. Reg Morrison presents an excellent paper with interesting material on hydrogen's unique chemistry and contribution to organic chemistry. He too draws the reader's attention to the action of other essential elements.

Lynn Margulus expands on the Gaia hypothesis, showing the earth to be a self-regulating system and, in general, neglected by science. This approach transcends traditional biology and shows that neo-Darwinism is an inadequate concept when attempting to explain a "whole earth approach." Margulus and Dorian Sagan delve into symbiogenesis, a valid ecological phenomenon, and discard neo-Darwinism.

Several writers address emergence, a hierarchy or a series of ascending levels that arise from the ones below. Ian Barbour discusses evolution and process thought, suggesting there could perhaps be brief periods of change with many genes involved, followed by long periods of

stability. Several papers further explained the issue as to whether evolution can be influenced by the environment, the makeup of the organism, and random genetic mutations. The environment influencing "genetic change" challenges a central dogma of science.

It seems that most of the contributors would consider it as practical wisdom to actively resist teaching "creationist" beliefs in the public schools as science, as this would favor one religious viewpoint. Howard Van Till says that naturalism denies the reality of God and has put nature in God's place. Yet the sciences can say nothing about the being or the nonbeing of God. The fine tuning of the laws of a carbon-based nature run by hydrogen needs to be re-assessed and expanded.

John Green also made a significant contribution to the history of evolutionary thought, again noting that some in science aim to exclude God from his universe. He argues that scientific naturalism has reduced human experience to sensory perceptions and human nature becomes a product of natural processes. R. J. Valenza, a mathematician, presents an excellent paper about the new atheism, saying that the physical world is rational, occupied by autonomous life with consciousness and the ability to be aware of its environment.

Other writers explored the postulate of an encounter with an eternal Mind. Because rationality underlies our world, if anything exists then something preceded it, thus allowing for God, a divine attribute of absolute simplicity. Process theology allows for many levels of activity in humans between molecular structure and personhood, concentrating on what is of value to the organism as a subject rather than Darwinism that limits itself to a study of objects.

The book achieves its aim in demonstrating that a materialistic approach to evolution is inadequate and misleading, and that a rejection of purpose in evolution is to embark on a metaphysical, not a scientific approach. The book shows that there is a better-based metaphysics available. This book has a Contents page, a contributor's profile, extensive footnotes documenting sources, but no bibliography or index. *Back to Darwin* is recommended to readers of this journal.

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Social Science

IN GOD WE TRUST: Understanding the Culture War in a Scientific Age by Victor Shane. Summerland, CA: Para-Anchors International, 2008. 212 pages. Paperback; $19.95. ISBN: 9781878832054.

What is America's culture war really about? Who are the warring factions, and what do they want? What set of beliefs drives the ideology of the Christian right? Conversely, what set of beliefs drives the political left? How do these beliefs divide America when it comes to the Judeo-Christian worldview, abortion, human sexuality, and euthanasia? These are just some of the questions that Victor Shane addresses in the book currently under review.

In a vividly written composition of essays, Shane seeks to demonstrate that America is in need of another religious awakening. He attempts to stir the hearts and minds of the silent majority in American society who realize that the United States was founded upon a biblically based moral code, and contends that if America would lead the way back toward higher moral ground, the world would follow in short measure. Several assumptions and presuppositions underlie the book under review. For example, Shane holds that truth is noncontradictory, is consistent with reality, and is the essence of successful prediction. Moreover, he holds that the cosmos (i.e., the sum of physical reality) is a single, finite system with a definite beginning and end. Further, he contends that there is no separation of cause and effect. He asserts consistently that the Bible uses language of analogy, accommodation, metaphor, and symbolism.

In chapter one, "God and the World: Dichotomy, Not Dualism," Shane notes that there is a dichotomy between Creator and created thing that is apparent in the polarization of the US Congress and the judicial system. He favors the term dichotomy over dualism to mark the proverbial Manichean struggle between left and right, believer and nonbeliever, and conservative and liberal. In chapter two, "Creator and Created Thing: The Dichotomy," Shane seeks to establish the atemporality of the Judeo-Christian God. He notes that only God is original and that the cosmos—and hence everything in it—is derivative. This labeling of derivative versus original begins a consistent contrast throughout the book that demonstrates how (post)modern society continually chooses derivative living over and above original living. He asserts that all of the cultural wars present in American society today are, in fact, due to the clash of these two competing worldviews, whether it is an issue of abortion, same-sex marriage, or death-on-demand. Shane asserts that ethical prescriptions should correspond to physical descriptions of the world in chapter three.

Revealing the obvious influence of Robert Bork's *Slouching towards Gomorrah* (Regan Books, 1966), Shane claims in chapter nine that American Christians must use the American political system to revive the original consensus in the due process of law and to fix the things that are broken in America. Naturalists, humanists, atheists, radical feminists, homosexuals, abortionists, and pornographers all tend to deny the existence of the Creator and give primacy to the created thing, according to Shane. In chapter fifteen, Shane asserts that the challenge before American Christians today is surmountable if they become once more salt and light, swaying society back toward the God of their faith.

In sum, Shane invokes reference to the Ten Commandments in virtually all of the fifteen chapters. One criticism of my own is that Shane is not consistent in his appellation of original to that which is good, and derivative to that which he perceives as bad, which makes the consistent employment of these terms problematic, and somewhat belies the usefulness of this typology of classification. Moreover, Shane's lack of gender neutrality in pronouns perhaps hurts the dissemination of his ideas. I contend that Shane also at times misuses the Scriptures and does not convey its original sense in an appropriate manner. Though I do not agree with his particulars at

all times and the language used is often inflammatory, nevertheless, the intent behind this book is well-founded, and its message should be heeded. As such, I deem it a profitable read.

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Letters

The River Pishon Flows Again?

I received an interesting e-mail from a Saudi Arabian who read my article "Garden of Eden: A Modern Landscape" on the *PSCF* website (*PSCF* 52, no. 1 [2000]: 31–46). Here is what his e-mail said:

> I read your article on the Pishon River—this totally amazed me as something interesting happened recently. Just in November 2008 there were very heavy rains in northern Saudi Arabia—the heaviest in 70 years. There was so much water that the desert turned into lakes (still there, and people are jet-skiing in these waters!). The flow cleared a lot of dust and sand from an ancient riverbed that nobody cared much for. This is Wadi Rumma (or Rimah as per the map in your article). I did go there a week later and saw the water was still flowing. Unfortunately my camera conked out on me but I do have pictures taken by others.

This e-mail helps support the idea that the Wadi Rimah-Wadi al Batin was the ancient Pishon River of Gen. 2:11–12, and if climatic conditions were right, it could flow again!

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Chasms in Gaps

Ronald G. Larson, in "Revisiting the God of the Gaps" (*PSCF* 61, no. 1 [2009]: 18), wrote:

> If we apply methodological naturalism to the history of Christianity, and avoid GOG thinking, are we not led to seek the origin of Christianity entirely naturalistically, and so assume that the early church came to believe in the resurrection of Jesus through error, fraud, or legend?

This question tragically assumes that methodological naturalism is philosophical naturalism, dogmatically equivalent to scientism and materialism. But an empirical method does not determine philosophical and theological outcomes. It only provides that science is limited to what is empirically testable, whether directly or indirectly. The resurrection of Jesus is outside of the scope of science, first, because it is unique; second, because it is ascribed to a Power outside of nature. Larson's question involves an egregious error.

A second error that permeates the paper is the unspoken assumption that the explanations filled by God of the Gaps arguments represent places where natural explanations are impossible. It is, for example, the dogmatic assertion that the Almighty God could not have created a universe where natural processes produced life. Is Larson competent to place this limit of the wisdom, knowledge and power of God? The "Summary and Final Thoughts" (pp. 20–21) indicate that he is not aware of the tension between the body of his paper and classical theology.

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Natural Explanation but Half the Story: No Room for God There

The wide-ranging article "Revisiting the God of the Gaps" (*PSCF* 61, no. 1 [2009]: 13–22) by Ronald G. Larson made me uncomfortable because of how often the phrase "argue for the existence of God" appears. I wonder whether a scientific (natural) explanation trumps a Christian explanation. Let me make three points.

First, here is a situation which makes plain that there are always two explanations (if not more). A plane crashes. The first question: Was it pilot error or a system failure? Science deals with things like the system of this plane and the system of the world. The question of pilot error shows that there can also be an explanation in which the agent responsible for the flight made a mistake. Although in this case we have alternative explanations, they are not of the same type.

Consider the following scenario: I walk into a room and see the kettle boiling. I ask, "Why is the kettle boiling?" A wise-acre in the room tells me that electrons running through the heater wires collide with irregularly placed atoms and make them vibrate violently. These vibrations pass to water molecules and when they vibrate with sufficient energy some molecules leave the liquid phase. We say the water is boiling. Of course, I was expecting another explanation, "we are making tea." Here we have two valid explanations, at least two that will always exist when humans do something.

Second, a God-of-the-gaps explanation will always fail if it is offered at the level of science, because proper scientific explanations do not invoke an agent as a factor in the phenomenon considered. The examples of the boiling kettle and the plane crash make it plain that this material kind of explanation is complete in itself.

Since the Christian faith is so utterly materially based (the Creator's choice), I do not think it impossible that there will be a scientific explanation found for everything to which we pay attention. But as Polanyi in *Personal Knowledge* makes clear, both choice and moral questions enter into the doing of science: thus the explanation of even scientists' actions can always be made in terms of the agent's purpose.

Third, since without invoking an agent one cannot discuss design, let us go to a level where both kinds of explanation can be used. At this level, when observing