tion is, in the first place, a defining mark of our human response to God's loving address. It is a universal mark, "essential," one could say. As Charles A. Coulson once expressed it: "Religion is the total response of man to all his environment." Consequently, religion is not irrelevant to, or in conflict with, or complementary to, or simply an influence on, science, but rather the very ground of scientific practice.

For those who wish to get a good overview of the present status of science and religion as viewed by contemporary historians of science, this is a good book. It could also serve as an intellectually challenging introduction for undergraduates in a science/religion course. Whether it will satisfy historians of religion is another question. Nevertheless, we should take Weldon's encouragement to heart, namely that we "remain open to finding ways to talk about what we broadly and imprecisely call 'the history of science and religion'" (p. 16).

Reviewed by Arie Leegwater, Calvin College, Grand Rapids, MI 49546.

Origins

EVOLUTION: Still a Theory in Crisis by Michael Denton. Seattle, WA: Discovery Institute Press, 2016. 354 pages. Paperback; $24.95. ISBN: 1936599325.

The genius of Darwin's *The Origin of Species* was that it provided a simple and elegant mechanism to account for the great diversity of life observed in the natural world. The textbook picture is that normal miniscule genetic variations in a population, when they confer reproductive advantage, are passed on to offspring and carried through the generations. The accumulation of these miniscule adaptations over extreme spans of time eventually leads to divergence of populations into distinct and reproductively isolated species that occupy their own ecological niches. Thus, the core of a Darwinian view is that features are only passed along through the generations if they confer reproductive advantages, and if the process leading to the genesis of distinct species is slow.

Michael Denton's recent book, *Evolution: Still a Theory in Crisis*, provides an extended argument against an extreme interpretation of Darwinian evolution in which all biological features must result from gradual adaptation driven by natural selection. His argument has two prongs: (1) that certain biological features cannot be explained by adaptation (i.e., there are features in animal biology that are apparently nonadaptive) and are thereby hidden from the process of natural selection; and (2) that many features that define distinct groups and species appear to have arisen either suddenly or without any conceivable step-wise process. Although he agrees with the power of natural selection to drive microevolution (evolution occurring within the boundaries of a species), his argument is that it is insufficient to account for macroevolution (evolution that jumps boundaries, leading to novel clades and species).

In the introduction, Denton frames his argument by contrasting "functionalist" and "structuralist" visions for biology. In functionalism, adaptation to serve a particular function is the primary driver of biological organization, while for a structuralist paradigm, the structures themselves are not the result of an adaptive process, although adaptation can occur on top of foundational biological structures. Denton is firmly in the structuralist camp and argues that the features that differentiate one biological group from another cannot have arisen by a gradual process of natural selection. The first several chapters draw on contemporary biological perspectives as well as on older writing to defend this perspective, and to lay this the groundwork for the rest of the book.

A series of chapters called "Bridging Gaps" provides in-depth examples of biological structures that Denton argues cannot conceivably have arisen via a gradual adaptive process. One of these is the nearly ubiquitous five-fingered structure of tetrapod limbs, a feature shared by humans, whales, and bats but used for quite different behaviors by each (i.e., grasping, swimming, or flying). He argues that while adaptations have occurred in the context of this structure to allow humans, whales, and bats to employ their five-fingered limbs for starkly different behaviors, the plan itself appears to confer no special advantage. That same structure is used for quite different functions, indicating that the foundational structure itself could not have been the result of a gradual process of adaptation but must have instead arisen relatively suddenly by nonadaptive mechanisms. In other chapters, Denton provides similarly in-depth descriptions of other examples such as feathers, flowering plants, the enucleated red blood cell, bat wings, and language.

If not by a gradual process of adaptation, how did these structures arise? Denton seeks to address this question in the final chapters by arguing that rather than being the outcome of adaptation, these features and the biological order that they reflect have arisen due to the immutable laws of biology. Foundational structures, "taxa-defining novelties," have emerged from the self-organizing properties of biological matter rather than from variation and natural selection. Supporting this, he points to biological features such as the structure of cells, biomechanical influences affecting embryogenesis, and protein folding. Many readers will hear echoes of the "fine-tuned universe" and "anthropic principle" that are often employed to suggest that nature has favored the development of carbon-based and conscious life, although Denton uses this biological law perspective to explain features of life on Earth, rather than the existence of life.

My major critiques do not so much concern the details of Denton's book, although indeed, those details are worth puzzling over. Rather, in many ways, elements of Denton's approach and arguments contain echoes of other authors residing within the scientific mainstream who have described the importance of nonadaptationist and nongradualist evolutionary processes, such as Eldredge and Gould's "punctuated equilibrium" and Gould and Lewentin's "spandrels" papers. Rather than constituting a "crisis" for a Darwinian model of evolution, these additional mechanisms highlight that absolutism in any extreme (such as for an absolutist Darwinian framework) is unlikely to be convincing. In a 1997 essay, for example, Gould suggested a middle ground, in which we can recognize that a variety of mechanisms—such as natural selection, punctuated equilibrium, developmental constraints, chance, neutralism, genetic drift, and natural catastrophes—might be operating simultaneously and to varying extents to drive evolution (S. J. Gould, "Darwinian Fundamentalism," *The New York Review of Books*; June 12, 1997). And indeed, as Gould points out by quoting Darwin, even Darwin himself objected to an ultra-Darwinian vision:

> I placed in a most conspicuous position—namely, at the close of the Introduction—the following words: "I am convinced that natural selection has been the main but not the exclusive means of modification." This has been of no avail. Great is the power of steady misrepresentation.

Thus, Denton seems to protest against a Darwinian absolutism not even held by Darwin. Given the multiplicity of evolutionary mechanisms probably operating in tandem with a Darwinian mechanism (a thoroughly mainstream view), it seems an overstatement to name the evolving scientific picture a "crisis." Moreover, it is not clear why the book is entitled *Evolution: Still a Theory in Crisis*. Denton's book is not a critique of evolution per se (descent with modification), but rather what he perceives as a widespread Darwinian absolutism (p. 111). Oddly, since he laments that this exact linguistic fuzziness appeared in his prior book, *Evolution: A Theory in Crisis* (1985), it is unclear why it persists in the current book.

Denton's book is not an easy read. I found his writing to be dense and quite technical at points. However, summaries at the end of each chapter help frame the major arguments and the book's central thesis. Still, reading it would be a substantial undertaking for the lay reader. Despite the above points and the sometimes overblown rhetoric about the "Darwin propaganda machine" (p. 88) and the "corpse of Darwinian evolution" (p. 225), Denton's book made me think hard and delve more deeply into some of the nuances of evolutionary mechanisms that might have generated such a diversity of biological structure and function. It is likely that laws of biological form, random chance, genetic drift, punctuated equilibrium, and Darwinian adaptation may all have roles to play.

Reviewed by Matthew Van Hook, University of Nebraska Medical Center, Omaha, NE 68198.

Science and Religion

DICTIONARY OF CHRISTIANITY AND SCIENCE: The Definitive Reference for the Intersection of Christian Faith and Contemporary Science by Paul Copan, Tremper Longman III, Christopher L. Reese, and Michael G. Strauss, eds. Grand Rapids, MI: Zondervan, 2017. 691 pages. Hardcover; $59.99. ISBN: 9780310496052.

The *Dictionary of Christianity and Science* brings together Christian scholars to help explain the significant theories, issues, and individuals essential to the discussion of science and the Christian faith. Like other scholarly dictionaries or encyclopedias, it provides brief entries that succinctly explain each concept or issue. These entries represent a wide range of topics, from the philosophical to the scientific to the biblical and theological. The purpose is to provide a resource to help readers engage the issues related to science and faith.

A strength of this volume is in the way it provides clear, concise explanations of difficult and often complex issues. Through the use of cross references and recommended reading, the authors help readers understand the main ideas being discussed. In this way, the volume is easy to use and very readable.

Another strength is the way controversial issues are presented. For example, there are two entries that deal with climate change—one that interprets the scientific data to suggest that humans are having a significant impact on changing climate, and the second arguing that humans are not. Both address the issue biblically and scientifically while coming to different conclusions. A second example is the discussion of the days in Genesis. There are two entries that present the most basic views of Genesis 1: the days as literal 24-hour periods of time, and the framework approach. Both make their case well, demonstrating the advantages and disadvantages of each perspective. A third entry focuses on a basic explanation of a variety of ways Christians have interpreted the days in Genesis 1, providing a brief overview of each approach.

A weakness of this volume is what is missing, which betrays a more conservative evangelical bias. The entry on the various interpretations of Genesis 1, for example, does not include a mythological reading that grounds the interpretation of the text in the ancient cosmology of the Israelites and in the creation stories of the ancient world. Another example is the entry on death, which does not discuss the possibility of seeing physical death