Superconducting Super Collider project that was ultimately canceled in 1993. However, the Large Hadron Collider at CERN (the European Organization for Nuclear Research), located in Geneva, would be the project that successfully found the Higgs particle in 2012. Kaiser uses this as a bridge to his final set of essays on the cosmos, since the Higgs field itself leads naturally to an idea that explains the weakness of gravity compared to other fundamental forces, and how one might understand the earliest moments of the cosmos.

Cosmos is an appropriate final set of essays for Kaiser's book, since the quantum ideas prove to have profound implications for the entire history of the universe. This is also the most colorful set of essays from Kaiser, since he includes discussions on the search for extraterrestrial life, gravitation and black holes, the big bang theory, and even creation and evolution. The chapter, "The Other Evolution Wars," is particularly interesting in its descriptions of the interactions between science and religious faith. While Kaiser points out that some cosmologists, beginning with the Belgian priest Georges Lemaître, found a satisfying fit between their growing scientific view of an evolving cosmos and their theology, the situation soon and unfortunately changed to an acrimonious one with the advent of the modern creation science movement. Kaiser discusses the resurgent biblical literalism that denies an older cosmos and the big bang theory, and then briefly mentions "intelligent design." Unfortunately, Kaiser seems to lump the critics together rather haphazardly. Concerning his internet perusal of critiques from creationist web sites, he writes: "I found plenty of sites eager to sell the recent anti-big-bang books, along with DVDs such as *The Privileged Planet*, proffering 'evidence' of supernatural intelligent design" (pp. 248–49).

This statement implies that Kaiser assumes that the authors of *The Privileged Planet* are anti-big-bang adherents, which they are not. The issues of purpose, design, and intentionality are certainly at stake. It is noteworthy to me that the book by Peter Ward and Donald Brownlee (*Rare Earth*), and that by Guillermo Gonzales & Jay Richards (*The Privileged Planet*), are very similar in thrust, emphasizing aspects of planet Earth that appear rather unique in the cosmos, but because they diverge on the question of purpose, design, and intentionality, one is considered mainstream science (*Rare Earth*) and the other, creationist literature (*The Privileged Planet*). Although I personally do not promote apparent design in nature as an argument for supernatural design, I am saddened by all the harsh critiques, whether it is leveled against those who hold that science is in support of faith or whether it is leveled against good science in order to protect doctrinal positions. There do not need to be combative relationships between scientists and Christians, but scientists such as Kaiser are very much aware that they exist.

Cosmos includes a chapter on the amazing developments in modern cosmology. Since I did a book review of Roger Penrose's *Fashion, Faith, and Fantasy in the New Physics of the Universe* [*PSCF* 69, no. 3 (2017): 187–89], I was happy to see a discussion of his Conformal Cyclical Cosmology (CCC). Theoretical physicists respect the contributions of Roger Penrose, given his and Stephen Hawking's contributions to our understanding of space-time from general relativity. But the elegant ideas offered by Penrose in his CCC appear to not withstand the exacting toll of precision data in modern cosmology, and we await further ideas that will.

The book wraps up with some recent noteworthy events: the discovery of gravitational waves in 2015 and the death of Stephen Hawking in 2018. While the former heralded a new age in modern multi-messenger astronomy, the latter has brought us to the end of an era in which one of the most brilliant minds took on the challenge of understanding the universe, overcoming incredible odds and challenges. Again, the experience of personal struggles of one person did not prevent great accomplishments in scientific thought, and, in fact, may have contributed to it. *Quantum Legacies* ends with a positive note. Overall, despite the sometimes-awkward collection of essays, the book is an enriching read.

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PHYSICO-THEOLOGY: Religion and Science in Europe, 1650–1750 by Ann Blair and Kaspar von Greyerz, eds. Baltimore, MD: Johns Hopkins University Press, 2020. 274 pages, including bibliography and index. Hardcover; $54.95. ISBN: 9781421438467.

What is physico-theology? Is it merely a peculiar term for what is more generally known as natural theology? Physico-theology makes its clearest first appearances in John Ray's *Wisdom of God Manifested in the Works of Creation* (1691), *Miscellaneous Discourses* (1692), and *Three Physico-Theological Discourses* (1713). It also appears in William Derham's *Physico-Theology* (1713) and *Astro-Theology* (1715). Historically, these works set the standard for what the authors of Blair

and Greyerz's edited collection of papers include within "physico-theology." Using these titles as a guide makes it possible to judge that, while Walter Charleton's earlier book *The Darkness of Atheism Dispelled by the Light of Nature: A Physico-Theologicall Treatise* (1652) uses the expression, it is not found consistently within the genre; many other books that do not employ the technical term still belong within the tradition. If Ray had any predecessor, it is likely Robert Boyle, as Katherine Calloway argues from Boyle's *Disquisition about Final Causes* (1688). Her emphasis on this book, rather than Boyle's other earlier "physico-" titled books, is appropriate because it emphasizes not only the teleological aspect of physico-theology, but more importantly the empirical drive.

It is a small oversight in this collection that there was no chapter devoted entirely to Boyle, given how well he fits within the physico-theological genre. Henry More's *Antidote against Atheism* (1653) is frequently discussed in the collection as a possible forerunner of physico-theology. Calloway even shows that Ray follows him in the order of his arguments. However, she is right to say that More's Platonism is antithetical to the empirical impulse of physico-theological writers. Peter Harrison sets the term physico-theology etymologically in the company of similar words such as "physico-medical," "astro-theology," and "insecto-theology," all current through the period examined. These novel terms signal disciplinary boundary crossing where "physico-" is the catch-all for the many specialized "theologies" from nature. They explore the liminal zone of the questions of creation, generation, and eschatology in their most developed forms of those theologies.

Kaspar von Greyerz explains that by 1728 physico-theology was now firmly established, as evidenced by the editorial work of Johann Fabricius in his translation of Derham's *Astro-Theology*. Added to the translation was a bibliography of related works that Fabricius used to establish physico-theology within an older and more robust pedigree. In numerous new editions up until 1765, he increased this bibliography to seventy-five pages. Fabricius can include so many related works because he had a broader notion of physico-theology that reinforced "recognition of, as well as love and respect for, the creator." This seems to be a continuation of the theme in the German context as shown by Kathleen Crowther in the work of Jakob Horst, a seventeenth-century German Lutheran.

So, is there a difference between physico-theology and natural theology? Scott Mandelbrote suggests that while both are concerned with divine design and purpose, physico-theology tends to emphasize special providence or care. Several of the contributors to this volume also emphasize the apologetic role this played either against the bare mechanism that was attributed to Descartes or atheism more generally. Rienk Vermij holds that physico-theology was more about nature, whereas natural theology about theology, supported, in part, by the fact that it was primarily natural philosophers and naturalists who wrote on the subject, not theologians. In his examination of two physicians who wrote on physico-theology, the Dutch Bernard Nieuwentijt and the German Johann Jakob Scheuchzer, Vermij argues that physico-theology seeks to inform the interpretation of nature through the Bible. In contrast, in natural theology, it is nature informing one's knowledge of God.

In reality, many writers in the physico-theology genre are skeptical of the possibility of natural theology. Some of the most insightful chapters in this book were those in which theology was understood as a motivation and foundation for studying nature. Anne-Charlott Trepp noted that the Lutheran ubiquity of Christ in the sacrament of the Lord's Supper was no less a ubiquity of Christ in nature, grounding the possibility of physico-theology. Further, the Pietist emphasis on experience in religious life was conducive to empirical study.

> For, as God revealed himself through the materialized word in every individual creature, individual things immanent to the world, even the lowest in nature's hierarchy, gained a new dignity and transcendence not least in their bodily presence and materiality. (p. 133)

Martine Pécharman's treatment of Blaise Pascal's rejection of natural theology shows that the Jansenist Pascal proved more Calvinist than many of the English authors innate to the physico-theological project. Pécharman reveals how the early editors of Pascal's *Pensées* obscured both his skepticism about the sinful human's ability to rightly read the divine in nature, and also obscured Pascal's remark that the creation was insufficient to bring one to salvation. Instead, as Pascal said, nature alone will lead one to atheism or deism. This is, in fact, what happened not long after, as John Brooke notes, among the English Latitudinarians. Nöel-Antoine Pluche, another Jansenist, also avoids teleological arguments, as Nicolas Brucker explains. Pluche's survey work, *The Spectacle of Nature*, was aimed at an elite French

audience. "The question is rather how to know more about Creation, and therefore how to better revere the Creator" (p. 189). This theme of wonder leading to reverence permeates all physico-theological writers.

Physico-theology, even when not named as such, was also an active part of defenses against the early stages of biblical criticism (e.g., Spinoza and La Peyrère). Eric Jorink describes the detailed work of the Dutch author Willem Goeree, who used math and engineering to reconstruct a plausible Noah's Ark. Jorink briefly mentions Kircher's earlier attempt, but it would have been interesting to compare the two authors on that subject: a Dutch Calvinist and a German Jesuit. Did physico-theology join them or divide them? Antonio Vallisneri, a naturalist at the University of Padua, struggled to reconcile fossils, geological formations, and the Flood. Brendan Dooley shows that, at least in Vallisneri's work, physico-theology was not always, even if predominantly, adulatory toward divine providence. Vallisneri was comfortable with unresolved questions of fossils and the Flood.

John Brooke, in his chapter "Was Physico-Theology Bad Theology and Bad Science?," succumbs to the presentism he seeks to undermine with that provocative title. Regarding "bad science," he judges that while the proponents of physico-theology were all leaders in their fields, they were unduly "anthropocentric" in their reading of nature. Yet, when he comes to answer the question of "bad theology," he says it is a question that cannot be answered, since it is contingent on one's theological stripe. Why, one may ask, did he not rate science by the same standard, admitting his own scientific prejudice against the "anthropocentrism" of divine design, as if it somehow reduced the quality of the science? Despite this bias, Brooke adds an important theological insight in that design arguments that highlight divine care tend to pass too quickly over sin and natural evil. Pascal, as noted above, was an exception to this rule.

Brian Ogilvie, looking at several authors doing "insecto-theology," does not see the design theme as anthropocentrism, but rather that the attention of physico-theologians to function and design in insect morphology and behavior fostered genuine contributions to the field. Aesthetic values can be as much a part of what one brings to and takes away from physico-theology. Simona Boscani Leoni shows this happening as the perception of the Swiss Alps went from jagged and ugly to praiseworthy—a physico-theology of mountains moving in parallel with that trajectory. A deeper look into a connection between physico-theology of the mountains and Albrecht von Haller's poem *Die Alpen* (1732) would have been interesting here, especially given Haller's Swiss Calvinism and active role in questions of natural philosophy and religion. In botany, as "form" comes to serve the interests of beauty more than function, physico-theology can become unnecessary, as Jonathan Sheehan shows in an investigation of studies of flowers during this time.

This volume presents the subject with excellent variety, yet editorially holds together well, serving as an introduction to the intellectual phenomenon of physico-theology. Chapters sometimes overlap in their discussion of key works of the period, but this happily serves to connect them together. Like the disciplinary boundary crossing which is physico-theology, this collection of papers, handling authors mostly writing in the period 1690–1740—neither really "Scientific Revolution" or "Enlightenment" in our usual historical categories—gives insight into a generation that might otherwise be undervalued because it does not easily fit into either. It is a liminal zone where interesting natural experiments can happen.

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SCIENCE, RELIGION, AND THE PROTESTANT TRADITION: Retracing the Origins of Conflict by James C. Ungureanu. Pittsburgh, PA: University of Pittsburgh Press, 2019. x + 358 pages. Hardcover; $50.00. ISBN: 9780822945819.

Mythical understandings about historical intersections of Christianity and science have a long history, and persist in our own day. Two American writers are usually cited as the architects of the mythology of inevitable warfare between science and religion: John William Draper (1811–1882) and Andrew Dickson White (1832–1919). Draper was a medical doctor, chemist, and historian. White was an academic (like Draper), a professional historian, and first president of the nonsectarian Cornell University. Ungureanu's objective is to show how Draper and White have been (mis)interpreted and (mis)used by secular critics of Christianity, liberal theists, and historians alike.

Ungureanu opens by critiquing conflict historians as misreading White and Draper. The conflict narrative emerged from arguments *within* Protestantism from the sixteenth through nineteenth centuries, and, as taken up by Draper and White, was intended *not* to annihilate religion but to *reconcile* religion