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and methods of ethology; he includes the contributions of the three 1973 Nobel Prize winners: Karl von Frisch, Konrad Lorenz, and Nikolaas Tinbergen. The burgeoning field of behavioral ecology, related to the last two topics, is not addressed. In the reflective part of the chapter, the author comments, among other topics, on holism and emergentism, global warming, and the responsibility of biologists.

In the final chapter, Morange takes us on a tour of the developments that start with the science described in the previous two chapters and end in the present century. "Structural biology" (p. 331) is advancing our knowledge of nucleic acids and proteins. The relationship between the modern evolutionary synthesis and molecular biology leads to topics such as evolutionary developmental biology ("evo-devo"), epigenetics, and human genome sequencing. The contributions to human genome sequencing of Craig Venter are acknowledged, but the work of Francis Collins at the National Human Genome Research Institute is not. In the last pages of this chapter, and in the Conclusion section of the book, Morange gives numerous opinions on the topics he has covered.

Biologists will enjoy reading this book for the many insights and opinions it presents. They will appreciate reading about the history of their discipline from a French point of view. The English translation of this French book reads well; however, the footnotes and references need to be more suitable for the English-language readership. The footnotes, especially those intended to provide links to further reading, often refer to French-language books or journal articles; it would not be difficult to find many English language equivalents. Some of the French books listed as references are available in English translations. In the Preface, the author states that readers "should consider this book a first version, which their critical input will help improve" (p. xx). One would hope that the author and Princeton University Press will address this last critical comment about the book, for the book has the potential of being a valuable textbook for students.

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## GEOLOGY

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**READINGS ON EVOLUTION AND THE NATURE OF SCIENCE: One Christian's Perspective** by Keith B. Miller. Morgantown, PA: Mastof Press, 2022. 224 pages. Paperback; \$20.00. ISBN: 9781601268129.

Keith B. Miller has dedicated his career to conducting paleontological and geological research and teaching at a public university. In addition to his many contributions to the geoscience literature and his activity in professional societies, he has contributed multiple provocative articles that advanced faith and science dialogue, many in *Perspectives on Science and Christian Faith*. *Readings on Evolution and the Nature of Science: One Christian's Perspective* is a collection of sixteen of Miller's articles published between 1993 and 2018 and one previously unpublished manuscript. The articles are clustered among five sections that represent the foci of Miller's writing and public address.

In The Nature of Science section, Miller addresses misunderstandings of science held by the public. He describes how misconceptions have been promoted by traditional young earth creationists and intelligent design advocates who have great contemporary influence on churches, seminaries, local school boards, and state legislatures. In footnotes to the first article, "The Similarity of Theory Testing in the Historical and 'Hard' Sciences," Miller reveals that the integrity of historical science (such as geology and paleontology) was debated in the development of Kansas science education standards. Drawing from the philosophy of science and using examples from geology, he defends historical science as not different from "hard" science in its predictive and explanatory power.

While evolution is the volume's overarching theme, in the second article Miller examines science's nature as applied to the public debate over anthropogenic global warming. He recognizes widely held misconceptions of science that fuel the rejection of controversial theories such as climate change and evolution. These include misunderstandings of fact and theory and the misconception that "unproven" theories should not become the basis for public action. To demonstrate the importance of scale and context in theory making, Miller presents actual data sets

revealing patterns of global environmental change at different scales and timeframes. Incidentally, those climatic patterns up to 2012, the year of the article's original publication, have persisted since with increasingly observable and negative consequences. Finally, Miller considers the widespread rejection of scientific consensus motivated by religious, economic, political, or philosophical interests.

Two articles in this section focus on evolution as science, written to scientists and science educators likely holding an evolutionary view. In "The Misguided Attack on Methodological Naturalism," Miller rejects the intelligent design (ID) movement's claim that methodological naturalism (MN), the presupposition that limits science's purview to natural phenomena, is effectively the denial of the existence and action of God. Miller identifies that MN originated as an attempt by a Christian philosopher to limit science from transgressing upon questions more appropriately pursued by the arts, theology, and philosophy. "Ironically, by rejecting methodological naturalism, ID advocates have ended up supporting the very scientism that they claim to want to fight against" (p. 26). The article continues with a critical overview of the ID movement and perceived implications for science practice and education. While located in the Evolution and Theology section of the book, this article pairs well with "Design and Purpose within an Evolving Creation," in which Miller addresses claims about MN and evolutionary science by Phillip Johnson (1940–2019) and the ID movement. **Miller's** article was originally contributed to *Darwinism Defeated?* (Vancouver, BC: Regent College Publishing, 1999), a book that captured the debate between ID-anti-evolutionists and evolutionary creationists following the publication of Johnson's provocative *Darwin on Trial* (Downers Grove, IL: IVP, 1991). This section concludes with Miller's PSCF article, "Doubt and Faith in Science and Religion" (PSCF 70, no. 2 [2018]: 90–100), examining how both doubt and faith are relevant, even necessary, in both paths for pursuing truth.

Articles in the Evidence for an Evolving Creation section provide compelling examples of transitional forms and ancestral relationships in the history of life. Two serve as direct responses to claims that the Cambrian "explosion" is fatally problematic for evolutionary theory because so many different

forms appeared so suddenly upon the first appearance of invertebrate groups (the Cambrian Period is dated between 542 and 490 million years ago). Miller describes the difficulty of assigning founding species early in life's history to taxonomic groups and provides examples of metazoans older than the Cambrian showing a progressive, rather than sudden, increase in body plan complexity. Miller presents a well-illustrated and well-referenced overview of the Precambrian fossil record. He argues that the "explosion" extended over 20 million or more years, preceded by at least 40 million years of increasing complexity among soft-bodied metazoans.

"Common Descent, Transitional Forms, and the Fossil Record" is a clearly written and amply illustrated defense of evolution, highlighting different groups of mammals living on Earth over the past some 250 million years and their probable tetrapod ancestors. Miller "climb[s] down the tree of life" to demonstrate how increasingly older ancestors of living mammal groups become more difficult to distinguish from the oldest ancestors of other groups. "Countering Common Misconceptions of Evolution in the Paleontology Classroom" is written for college-level instructors, including an innovative cladogram construction exercise involving dinosaur taxa to demonstrate how evolutionary relationships are determined. Miller emphasizes that presenting scientific concepts in their historical context is an effective way to counter mistaken views that students bring to the classroom.

The nexus of Evolution and Theology is addressed with four articles (including one described above). In "Theological Implications of an Evolving Creation," Miller explains that the evolutionary history of life is consistent with creation's integrity, enormity, and goodness; the immanent and progressive nature of God's creative activity; and the image of God in creation. "An Evolving Creation: Oxymoron or Fruitful Insight?" returns to the nature of science and theology, with an emphasis on exploring ways to diminish the conflict view of science and faith. The section's final article, "God, Evolution, and Becoming Man" was written for seminarians and describes the fossil record of hominins (modern humans and closely related extinct species), demonstrating potential evolutionary relationships using paleontological, genetic, and inferred behavioral comparisons. Miller

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comments on implications for the meaning of *imago Dei* and our understanding of body and soul.

The Problem of Evil section opens with the theological implications of natural hazards. Miller questions if natural catastrophes are a consequence of the Fall described in Genesis 3, satanic manipulations of nature, or generally reflect God's judgment on sinful humankind. Considering the testimony of the Psalms and other biblical narratives, he concludes that post-Fall creation is good. As well, the geologic record reveals that severe natural events occurred with regularity before the Fall. Disturbances we perceive as hazards are essential to the maintenance of natural systems (the natural order). Past attempts to control hazards, such as wildfire suppression, coastal modifications, and flood control often make those hazards worse. Biblical concepts of environmental stewardship can be applied in order to live in harmony with creation.

“‘And God Saw That It Was Good’: Death and Pain in the Created Order” addresses the question of “natural evil” that leads to unbelief when unresolved, “as it was for Darwin, himself” (p. 198). Miller reviews traditional and novel approaches to theodicy. Recognizing that crucified Christ participates in the suffering and death of his creation, Miller proposes that “physical death, pain, and suffering are opportunities for the expression of Christ-like character” (p. 205). Miller draws insights on the problem of evil from J. R. R. Tolkien's *Silmarillion* and *Lord of the Rings* in the section's final essay.

Science as Christian Vocation is an article co-authored with Ruth Douglas Miller, “Staying on the Road Less Traveled: Fulfilling a Vocation in Science.” The Millers encourage students and early career scientists to look to their faith, in its teaching and traditions, to motivate and guide their work in ways that glorify God and further his kingdom.

Throughout, Miller is keen to avoid the sacred/secular dichotomy, believing that God “has a claim on all aspects of our lives” (p. 1). Professors at some Christian colleges are required to write a “faith and learning” paper in order to achieve tenure, an onerous task for those not used to engaging theology in their professional work. Here, Miller has written seventeen such papers while employed by a “secular” university! Science educators can benefit from

reading Miller's work to develop a sound understanding of the purviews of science and theology applicable to topics such as origins, climate change, and public health. I assigned multiple articles found in this volume as reading in several of my college courses. Remarkably, Miller was often three to five years ahead of resurging interest in many of these topics among evangelical scholars. Rather than republishing separate articles with modest overlap in material coverage, Miller might have organized the material into a unified text that could reach a wider or more targeted audience. Perhaps that's next?

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## HISTORY AND PHILOSOPHY OF SCIENCE

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**PIERRE GASSENDI: Humanism, Science, and the Birth of Modern Philosophy** edited by Delphine Bellis, Daniel Garber, and Carla Rita Palmerino. London, UK: Routledge, 2023. 416 pages. Hardcover; \$160.00. ISBN: 9781138697454.

Pierre Gassendi (1592–1655) is one of those names in the history of science whose contribution remains only vaguely understood or remembered. A French Catholic priest, philosopher, mathematician, humanist, and astronomer, Gassendi's advocacy of a theologically re-worked ancient atomic theory of matter was a significant factor in the demise of late medieval Aristotelian conceptions of informed matter. Gassendi was also highly influential in reviving ancient Epicureanism, the hedonist moral philosophy from which modern utilitarianism traces its origins. Advocating a theologically modified form of Sextus Empiricus's ancient skepticism—in which we have knowledge only of observable appearances rather than of metaphysical essences—Gassendi shaped the way modern scientific knowledge came to be understood. Gassendi was thus a key figure in the emergence of modern empiricism, which brought him into prominent conflict with Descartes.

This is a beautifully researched and presented volume by thirteen fine Gassendi scholars. The contributions are divided into three parts: Gassendi's Epicurean Project, Its Genesis and Its Sources; Gassendi the Polemist; and Gassendi's Science and Philosophy in