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Mathematics and Religion: Our Languages of Sign and Symbol (Book Review)

Abstract

Reviewed Title: *Mathematics and Religion: Our Languages of Sign and Symbol* by Javier Leach. West Conshohocken, PA: Templeton Press, 2010, 188 pages. ISBN 9781599471495.

Keywords

book review, Mathematics and Religion, Javier Leach

Disciplines

Christianity | Mathematics

Eiseley's "Charles Darwin, Edward Blyth, and the Theory of Natural Selection" in the *Proceedings of the American Philosophical Society* 103 (1959): 94–158.

³The *Correspondence of Charles Darwin, Volume 1: 1821–1836* (Cambridge: Cambridge University Press, 1985), 282, footnote 8.

⁴Susan Sheets-Pyenson, "Darwin's Data: His Reading of Natural History Journals, 1837–1842," *Journal of the History of Biology* 14, no. 2 (Fall 1981): 243.

⁵Jerry Bergman, *The Dark Side of Charles Darwin: A Critical Analysis of an Icon of Science* (Green Forest, AR: Master Books, 2011), 152 citing Rhawn Joseph, *Astrobiology, the Origin of Life, and Death of Darwinism* (San Jose, CA: University of California, 2000), 223.

⁶The *Correspondence of Charles Darwin, Volume 6: 1856–1857* (Cambridge: Cambridge University Press, 1990), 387.

⁷*Ibid.*, xiv.

⁸The *Correspondence of Charles Darwin, Volume 7: 1858–1859* (Cambridge: Cambridge University Press, 1990), 107.

⁹Peter J. Bowler, *Charles Darwin: The Man and His Influence* (Cambridge: Cambridge University Press, 1996), 112.

¹⁰Robert Westfall, *Never at Rest: A Biography of Isaac Newton* (Cambridge: Cambridge University Press, 1980). The title of chapter 3 is "The Solitary Scholar."

¹¹In 1964, Francis Crick, Hermann J. Muller, and Joshua Lederberg urged that the USA establish a large-scale eugenics program, and Crick suggested "the reversible sterilization of the citizenry by placing 'something into our food' and licensing 'the people with the qualities we like' to bear children." Cited by Howard L. Kaye in his *The Social Meaning of Modern Biology: From Social Darwinism to Sociobiology* (New Haven, CT: Yale University Press, 1986), 48.

Reviewed by Sara Joan Miles, *Historian of Science and Founding Dean Emerita of Esperanza College, Eastern University, St. Davids, PA 19087.*



MATHEMATICS AND RELIGION: Our Languages of Sign and Symbol by Javier Leach. West Conshohocken, PA: Templeton Press, 2010. xi + 188 pages, with glossary and index. Paperback; \$20.00. ISBN: 9781599471495.

Conceding that twenty-first century, visually oriented denizens no longer inhabit a literate culture, but seeking to reach out in words to those curious about our human place in the cosmos, the Templeton Science and Religion Series commissions compact scientific/theological explorations of big questions. "Doomed to fail," a skeptic scoffs. "But worth the effort," a sympathetic respondent counters, "if such a text gives, as intended, a good overview of the field for a general audience or rouses the occasional reader to delve more deeply into works on a similar theme."

Connections between mathematics, religion, and metaphysics spark few scholarly fires today. Professional mathematicians never explore such matters as part of their education, and hardly any theologians or philosophers are prepared to follow technical discussions that venture beyond elementary mathematics. Nevertheless, a small pocket of readers is interested in all of this on a general level, at least in North America, where the largely evangelical Association of Christians in the Mathematical Sciences continues to flourish.

This book comes out of a very different context and tradition, however. The author is a Jesuit priest who holds an academic position in mathematics and logic at a Span-

ish university. Trained in mathematics, philosophy, and theology, Javier Leach seems ideally qualified for writing a book on this topic. Drawing upon these disparate backgrounds, he relates religion, science, mathematics, and metaphysics not as antagonists or isolated spheres but as fields sharing common features and interests.

Mathematics and Religion is quite short, shorter even than the bibliographic data above suggests. The body of the text consists of nine brief chapters that run to only 130 pages. The remainder of the book is devoted to a preface (5 pages), ten rather technical appendices (30 pages), a glossary (9 pages), an essay on resources (6 pages), and an index (10 pages). With editorial assistance, the author might have integrated some of his appendices' material into the text (and dropped most of the remainder), but perhaps the publisher judged that enlarging the text proper in this way would reduce sales. Better editing would also have improved the English in a number of places. Readers familiar with idiomatic mathematical terminology will find statements such as " m is equal or less than n ," " π is transcendent," and "odd-grade polynomials with real coefficients have a real number solution" awkwardly phrased or momentarily perplexing.

The first two chapters of the book lay out Leach's overall schematic. Mathematics deals with objects of the mind via logic and formal language. Science deals with objects we perceive with our senses, and it asserts truths about them in representational language, though mathematics and logic are also indispensable. Metaphysics and religion deal with ultimate causes, which mathematics and science are constitutionally unequipped to address. The language of metaphysics and religion employs symbols and terms having personal, communal, and traditional meanings in addition to referring to ultimate realities. Appropriate evidences for the validity of claims in these fields differ, but assertions in each area must strive for consistency; without that, language and thought have no real value.

Chapters three and four give a highly condensed and Eurocentric history of mathematics and logic. Chapter five briefly recounts the rise of modern science, focusing mostly on Galileo, including his conflict with the Roman Catholic church, but giving some attention to Newton and a few later thinkers as well.

With this introductory material out of the way, chapters six and seven focus on the historical and systematic process of formalizing mathematics, and on the rise and contours of mathematical logic. These receive more extended treatment (40 pages), being closest to Leach's area of expertise and relating most directly to the current state of mathematics. Given its broad scope, however, this material contains a number of oversimplifications and omissions. Cantor is portrayed as if he reduced all of mathematics to set theory. Peano is never mentioned for his work on formalization. Brouwer's intuitionism seems to arise in response to Gödel's incompleteness results. Constructive mathematics is claimed to be a subset of classical mathematics. The syntax and semantics of formal logic are presented but with almost no mention of the role deduction systems play in constructing proofs (even though Gödel's completeness and incompleteness results touch primarily on deducibility). And so on. These defi-

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ciencies may be unavoidable, given the brevity of the text, but such are evidently the consequences of aiming to be so concise while trying to cover such a broad expanse.

Leach ties the fields of mathematics, science, metaphysics, and theology together with the connecting threads of language and logic. As the preface states, "This book is about our languages, ... by which we convey meaning." In all four fields, theories are constructed with language and rely upon logical reasoning. Individually, they share an interest in logical consistency, a concern made prominent by twentieth-century foundations of mathematics. Jointly, they complement each other and offer truths from their own perspectives.

Twentieth-century foundational developments in mathematics (especially incompleteness and undecidability results) also suggest, according to Leach, that mathematics is pluralistic and open-ended. Different perspectives are welcome, as are competing theories. If this is so for our most objective field of thought (and Leach sees this trend in physics as well), we certainly should be open to a variety of complementary perspectives from metaphysics and religion. Room is thus carved out for metaphysics and religion to consider ultimate questions. Mathematics cannot even decide all the important issues in its own field with axiomatic and foundational methods; it certainly cannot dictate positions outside its purview.

Complementarity is not due to these areas being totally disjointed. Each field has its own focus, language, and criteria for evidence, but it is a mistake, Leach says, to see them as nonoverlapping. They do not describe different worlds. "Mathematics and science try to answer how things are. Metaphysics and religion try to answer why the world is the way it is" (p. 128). Leach sums up his view of their interrelationships with a model he calls *Non-Symmetrical Magisteria*: while these fields each have authority in their own domains, they are related through language and logic, albeit in a nonsymmetrical way.

Religious knowledge needs science, while science can do without religion. In effect, this asymmetry is a plus for science by making it autonomous, but it is also a plus for religion by endowing religion with a more comprehensive vision ... [F]aith cannot close its eyes to mathematics and the empirical sciences. I can separate mathematics from theology, but I cannot separate theology from mathematics. Mathematics and the empirical sciences are independent of religious beliefs, but theological reflection cannot do without mathematics and the empirical sciences. (p. 131)

In this way Leach gives a sort of primacy to mathematics and science. In fact, he even says a few pages earlier that "the history of Christianity ... can be viewed as a series of responses to scientific cultures over the ages" (p. 127). He finds no intrinsic influence passing from religion and philosophy to mathematics and science; the latter are autonomous. But a grounded and well-rounded metaphysics and theology need to take into account what we know about/from mathematics and science.

Assessing the book's success in relating mathematics and religion depends upon one's own preconceptions of the fields involved and how they are properly linked.

The heavy focus on logic and the posited asymmetric relationship between mathematics and religion/philosophy are not universally accepted by historians and philosophers of science and mathematics. Many now conceptualize mathematics more in the way it is holistically practiced than as an abstract body of formalized theoretical results. Leach's outlook may also be questioned by evangelical Christian mathematicians, some of whom believe there is a more integral way to relate their faith to their professional work. But *Mathematics and Religion* does offer an informed discussion of the topic by a mathematician committed to faith in Jesus Christ, and as such provides a viewpoint readers can use to test and sharpen their own ideas on the relationships.

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ORIGINS & COSMOLOGY

EVOLUTION: A View from the 21st Century by James A. Shapiro. Upper Saddle River, NJ: FT Press Science, 2011. 253 pages. Hardcover; \$34.99. ISBN: 9780132780933.

Whether James Shapiro is prescient or just a maverick, time will tell. Either way, this relatively short volume is a refreshing change from the constant barrage of books lambasting other positions while rehashing the same tired arguments for their own. Shapiro argues against Darwinism, but for evolution: he presents an evolutionary model that is saltational, a teleological model in which the cell itself sets the goal, a natural genetic engineering model without an intelligent engineer. Exceedingly well documented and highly technical, this will not be an easy read unless you have a good knowledge of modern molecular genetics, but Shapiro suggests a method whereby other readers can get the main idea without getting lost in the details.

The book is divided into four parts (without designated chapters). The first three lay out what we know about the way the cell works, focusing on recent advances in molecular biology. The last part shows how the first three suggest a new conceptual basis for evolutionary research, and why philosophical commitments prevent many researchers from accepting this new approach. The text itself is less than 150 pages, followed by a 25-page glossary and 65 pages containing over 1,000 references to the primary scientific literature. There are over three hundred more references online, documenting the examples cited in tables in Parts Two and Three of the book.

Throughout the book, Shapiro challenges many key tenets of Darwinism, including gradualism and the primary role of natural selection. He begins the book with the statement,

Innovation, not selection, is the critical issue in evolutionary change. Without variation and novelty, selection has nothing to act upon. So this book is dedicated to the many ways that living organisms actively change themselves. (p. 1)

Shapiro then proceeds to show how cells not only change their gene expression, but also make rapid changes to the