BOOKS: SCIENCE AND RELIGION

A Skeptic's Sense of Wonder

W. Mark Richardson

Chet Raymo, in *Skeptics and True Believers: The Exhilarating Connection Between Science and Religion*, uses science and the history of science richly and illustratively to explore the ways humans interpret and find meaning in the universe. His attractive book presents well defined characterizations of two classic dispositions of the intellect in the face of tradition, scientific knowledge, and human experience in general that are both alive in our culture. First, there are "True Believers," who prize certainty, security, and a human-friendly reality, often at the expense of openness to the full force of evidence—evidence that reveals a universe of brutality as well as beauty. These are people Raymo remembers from his Roman Catholic childhood in the South, and who reappear in present day Protestant fundamentalism. Second, there are "Skeptics," who relinquish certainty and human-centered questions to enter the search for hard-won, testable truths. For them, belief remains tentative, always subject to the rigorous pressures of testing and the flux and change of theory and data. These are people of Raymo's adulthood; they trained him in science, and as professor of physics at Stonehill College he carries forward their tradition. (He is also a columnist for the Boston *Globe*, which accounts for his seemingly effortless and captivating prose.)

Skeptics and True Believers
The Exhilarating Connection Between Science and Religion
by Chet Raymo

Walker, New York, 1998. 300 pp. $23. ISBN 0-8027-1338-6.

Raymo is not ambivalent about where he stands. As a skeptic, he champions a brutal honesty with respect to beliefs, allowing them only something approaching hypothetical status. He is indebted to the rigor of scientific method. He also finds in skepticism a resilient and expansive outlook, and he combines this with an openness to the awe and wonder of the scientifically disclosed universe and life within it. His spirituality centers in a sensitivity to the way scientific knowledge interfaces with the mystery that lies beyond science itself, but within the universe science explores. According to Raymo, this sensitivity is the heart of a new religious consciousness borne of the scientifically enlightened mind, and it is the theme of his book—a kind of spirituality without belief. In the book, we find no positive claims of a religious sort even modestly asserted, but we do find many scientific experiences of wonder and awe, many breathtaking observations that lead to apprehensions of mystery.

Early in his book Raymo, quoting himself from an earlier work (*1*), uses a compelling metaphor to capture his personal quest for a spirituality fitting his scientific perspective: "all scientific knowledge that we have of this world, or will ever have, is as an island in the sea of mystery. We live in our partial knowledge as the Dutch live on polders claimed from the sea. We dike and fill. We dredge up soil from the bed of mystery and build ourselves room to grow … Scratch the surface of knowledge and mystery bubbles up like a spring. And occasionally, at certain disquieting moments in history (Aristarchus, Galileo, Planck, Einstein), a tempest of mystery comes rolling in from the sea and overwhelms our efforts…" (p. 47).

To paraphrase Raymo's position, as the island of knowledge grows, the surface that makes contact with mystery expands. When major theories are overturned, what we thought was certain knowledge gives way, and knowledge touches upon mystery differently. This newly uncovered mystery may be humbling and unsettling, but it is the cost of truth. Creative scientists, philosophers, and poets thrive at this shoreline. I love the metaphor, although it can leave the impression that the object of our religious life is found only at the boundaries of what we know, not in the known as well. In this respect, Raymo takes a position similar to that of physicist Paul Davies. Upon reaching the "boundary questions," Davies turns silent in the face of mystery or he thinks of the Absolute (or whatever is at the edge of science) in austere and minimalist terms—as source of the principles of the universe discovered through science, for example (*2*). Accordingly, our hard-won knowledge may bump up against mystery and leave us in states of awe and wonder, but on matters of ultimate concern this knowledge produces nothing that can be put into words.

Note that *Skeptics and True Believers* does not present a "religion versus science" scenario. The book is about types of intellectual leanings, not science and religion in conflict or utterly independent of each other (though perhaps Raymo's interpretation is close to the latter). Raymo claims that vital religions contain three elements: "cosmology (a story of the universe and our place in it), spirituality (personal response to the mystery of the world), and liturgy (public expression of awe and gratitude, including rites of passage)" (p. 2). So the contact point between science and the religion of his ideal is "cosmology." A coherent religion today will be integrated with a scientifically credible cosmology. So far so good. But the impression left in the book is that a spirituality built upon the skeptical disposition can have no firm beliefs—mysteries, but no beliefs. Beliefs, after all, come and go with the shifts and turns of science. Nevertheless, Raymo's spirituality can at least awaken reverence for life and profound respect for natural mechanisms and processes. Perhaps it can inspire some kind of morality and ritual. (See pp. 181 and 214 for examples of Raymo's rendering of religious possibility.)

On the question of cosmology and its status for religion, I am reminded of a distinction that is not clear in *Skeptics and True Believers* but is recognized by astrophysicist George Ellis as the difference between "cosmology" and "Cosmology" (*3*). The former, according to Ellis, is physical cosmology; the latter is our interpretation of physical cosmology within a larger frame of meaning, which includes answers to such questions as: What are the origins of all there is? Who are we and what is our destiny? What is the end or purpose of the universe? These metaphysical questions, though highly dependent on science for their intelligibility, are not fully comprehended within the sciences as such. At times Raymo's depictions of scientific knowledge bleed into his interpretations of its religious significance without careful attention to the distinction between scientific knowledge and its metaphysical interpretation. I do not understand the criteria Raymo applies for developing a "Cosmology" that embodies religious significance, or how he would distinguish such a "Cosmology" from physical cosmology. Religion built strictly from scientific entailment and the beliefs it can evoke in us are just as vulnerable to David Hume's criticisms as were the natural theologies of the 18th century. In his *Dialogues Concerning Natural Religion,* Hume persuasively argues that Nature by itself does not yield a single unambiguous interpretation at the level of religious meaning.

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This resistance to firm beliefs is perhaps the greatest difference between Raymo and others who acknowledge mystery but wish to make positive religious claims as well. Consider once again the example of George Ellis. True to his tradition as a Quaker, he is humble about the ability of religious language to capture the essence of "God." Yet at the same time, both Quaker tradition and the universe he observes as astrophysicist yield intimations of the nature of God. The world can not guarantee his beliefs (mystery prevails) but he insists the world he observes is congenial with the thesis that God is love and is self-giving. The premise is, for him, the basis for the moral and spiritual orientation of his life.

On reading Raymo, one wonders if a positive claim such as Ellis makes is always a mere clinging to false hopes, motivated by needs for certainty and security. Is all traditional belief closed-minded belief? One cannot be sure about Raymo's opinion on this matter, since the examples of true beliefs he provides include Santa Claus, astrology, rituals of fire walkers, the healing rituals of Lourdes, and the authenticity of the Shroud of Turin. But in view of his remarks about "True Believers" and "tradition," it seems clear that the two are bound together in his mind.

My principal criticism of Raymo's account is that he characterizes "True Believers" as needing to see the world in black and white, yet he seems to capitulate to just this kind of thinking in his two-term typology. In my opinion, the more interesting cases are subtler, in the gray areas between "Skeptics" and "True Believers." Here one finds those who can hold fast to the beliefs organizing their lives even when certainties of a scientific kind are not available (they never are available at the level of religion and metaphysics), while recognizing themselves as fallible and their beliefs as open to revision should scientific evidence and human experience require change for the sake of truth.

There are certainly scientists who find the interesting issues at the interface of science and religion are located in the way long-held traditions—Islam, Christianity, Judaism at their intellectual and spiritual best—might be in dialogue with contemporary science. We tend so often to belabor the extremes (creationism versus evolution, to borrow one of Raymo's examples) that we miss the more intriguing, even if more difficult, possibilities (such as evolution and theism). Where is the definitive argument against these possibilities? There are some within the monotheistic traditions (surely a minority, but a growing number) who take evolution quite seriously and find that it enlightens, rather than undermines, their religious belief. The only way Raymo, with his two intellectual postures, can deal with their perspective is to view their intermediate position as a symptom of "True Believers"—needing security, they will not relinquish outdated ideas. But many hold to such beliefs for much more complex reasons than fear or need for comforting ideas. Furthermore, we all hold some beliefs of such importance that to change them would be to change who we are. These beliefs we change only quite reluctantly, even when in principle we are open to the change. Is Raymo's tenacious belief a nature-based mysticism (such as he describes so beautifully, especially in the second half of the book)? This perspective is surely possible, but it is not the only one. And, as Raymo himself admits, science itself is ultimately silenced by mystery—so who will arbitrate the core differences?

I disagree with Raymo at a philosophical level, but I am filled with admiration for the clarity and force of his writing, and for the many deep insights contained in this book—too many to mention in a short review. I learned much from Raymo's book, and enjoyed it immensely. *Skeptics and True Believers* raises profound questions about how we face, filter, and deny realities about the universe as received from science. It is accessible to anyone wishing to explore the "exhilarating connections between science and religion."

References

1. C. Raymo, *Honey from Stone: A Naturalist's Search for God* (Hungry Mind, St. Paul, Minnesota, 1997).
2. P. Davies, *The Mind of God* (Simon and Schuster, New York, 1992).
3. G. F. R. Ellis, *Before the Beginning: Cosmology Explained* (Boyars, London, 1993).

BROWSINGS

Cats' Paws and Catapults. Mechanical Worlds of Nature and People. *Steven Vogel.* Norton, New York, 1998. 382 pp. $27.50, £19.95. ISBN 0-393-04641-9.

Vogel presents an enjoyable and informative introduction to biomechanics by comparing of how organisms function, move, and grow to more familiar human technologies. He explains how the designs of nature and human creations have been determined by the interactions of physical law and historical accident, and cautions against favoring natural design as the standard for judging technology or its impact.

Combinatorial Chemistry. *Nicholas K. Terrett.* Oxford University Press, Oxford, 1998. 200 pp. $49.95, £25. ISBN 0-19-850220-6. Paper, $28.95, £14.95. ISBN 0-19-850219-2.

Combinatorial synthesis aims to rapidly generate large numbers of chemical compounds. Terrett describes the development of major techniques in this area and their application in areas such as drug discovery, molecular recognition, medical diagnosis, optimization of chemical processes, and semiconductors.

DNA Damage and Repair. *Jack A. Nickoloff and Merl F. Hoekstra, Eds.* Humana, Totowa, NJ, 1998. Vol. 1, DNA Repair in Prokaryotes and Lower Eukaryotes. 640 pp. $125. ISBN 0-89603-356-2. Vol. 2, DNA Repair in Higher Eukaryotes. 653 pp. $125. ISBN 0-89603-500-X.

In these two volumes, active researchers review a variety of DNA repair mechanisms and their interactions with replication, transcription, recombination, and cell cycle regulation. The first volume emphasizes model systems, and the second examines mammalian organisms and relationships between DNA repair and disease, particularly cancer.

The Rise of the Standard Model. Particle Physics in the 1960s and 1970s. *Lillian Hoddeson et al., Eds.* Cambridge University Press, Cambridge, 1997. 744 pp. $80, £55. ISBN 0-521-57082-4. Paper, $34.95, £24.95. ISBN 0-521-57816-7.

The Standard Model combines quarks, leptons, and their interactions in a basic theory of matter. In these 38 chapters, elementary particle physicists and historians of science provide nonmathematical and often personal accounts of experimental, institutional, and theoretical aspects of the development of the model.

The Rising Curve. Long-Term Gains in IQ and Related Measures. *Ulric Neisser, Ed.* American Psychological Association, Washington, DC, 1998. 431 pp. $39.95. ISBN 1-55798-503-0.

Researchers in psychology, sociology, psychometrics, and nutrition defend a variety of explanations for increases in intelligence test scores throughout the industrialized world and a substantial decrease in the interracial gap in school achievement in the United States.

What Have We Learned About Science and Technology from the Russian Experience? *Loren R. Graham.* Stanford University Press, Stanford, CA, 1998. 193 pp. $39.50. ISBN 0-8047-2985-9. Paper, $14.95. ISBN 0-8047-3276-0.

Considering universal and specific aspects of Russian science, Graham finds strengths and weaknesses in social constructivism. He also concludes that science can flourish in adverse conditions and does not require nurturing freedom.