

BOOK REVIEWS

Religion and Science: Historical and Contemporary Issues by Ian G. Barbour. San Francisco, California: Harper-Collins Publishers, 1997. 360 pp. (pbk) \$19.00.

Salient features of the current age set the agenda for this work. Included in the age are omni-present technological devices in the environment of ordinary persons, a popular mentality largely shaped by simplified versions of scientific theories, and religious pluralism springing from global communication as well as from liberation and feminist movements. Barbour also includes threats to the environment on a planetary scale as among the defining features of this epoch.

This book is a revised and extended edition of *Religion in an Age of Science: The Gifford lectures, 1989–1991*. (Most, perhaps not all, readers of the *Journal of Scientific Exploration*, will recall that the Gifford Lectures are given in Scotland by persons universally recognized as leaders in theory of religion.) Relations, harmonious or otherwise, between religion and the surrounding culture, are usually a major theme of the Gifford Lectures. Barbour apprehends meetings between religion and science in every age, but in his view the very meaning of each of those two has changed from time to time in world history.

The medieval picture of the universe was a synthesis of Aristotelian cosmology (read: science) and Christian theology (representing religion in this case). Barbour is quoting an almost universally accepted opinion when he states that the God of St. Thomas Aquinas was equally the unmoved mover of classical philosophy and the personal Father depicted in the Bible. Humanity, in the medieval perspective, was at the center of the cosmic drama in the spiritual sense as well as in the astronomical sense.

The Copernican model of the solar system opposed the idea that the earth is the physical center of planetary motions. Some of the ancients had equally opposed the earth-centered theory, but their opinions did not prevail. Galileo's discovery of Jupiter's moons refuted the opinion that the earth is the center of all astronomical motion. Galileo also noted that the planet Venus, as viewed through a telescope, waxes and wanes in a temporal order consistent with the Copernican idea that the earth, Venus, and other planets revolve around the sun.

Incidentally, the Copernican explanation of the apparent revolution of the sun around the earth appears to refute the biblical story that Joshua made the sun stand still by an appropriate appeal to Deity. A sudden stopping of the earth's turning on its axis would, of course, have been catastrophic. Barbour

points out, however, that Galileo did say that the Book of Nature and the Book of Scripture cannot conflict since they were written by the same author.

Newton, who went much further in modeling a world machine, still took as virtually axiomatic the doctrine of a designer-God. In discussing these things, Barbour dramatizes the difference between mechanical causation and the "actualization of potentials" which Aristotle and St. Thomas celebrated because viewing events as purposive.

The author's analysis becomes deeper and more subtle when he discusses the views concerning the meaning of causality set forth by the Scottish philosopher Hume and the German philosopher Immanuel Kant. As for history of science, Barbour's next major move is a consideration of biology and theology in the nineteenth century. There is considerable emphasis upon the contributions of historical geology prior to Darwin. By the beginning of the nineteenth century, Georges Cuvier had reconstructed from fossil bones more than twenty now extinct species, including the giant mastodon. He taught that a variety of creatures had been produced by special acts of divine intervention. At the same time, James Hutton assumed the operation of regular causes such as sedimentation, volcanism, and erosion acting through great spans of time to change environments, and with them the relative viability of different life forms. A major point to be made here is that a need to reinterpret biblical sayings about earth history was apparent to most literate persons long before Darwin's specific views made the need more acute. Biological doctrine, itself, has undergone fits of revision ever since Darwin, and some of the mechanisms of driving agencies of evolution are still receiving critical scrutiny on the eve of the year 2000.

Barbour compares methods of progress in scientific and theological thinking. He observes that both are founded upon crude data which give rise to imagined analogies and then to formal models and abstract concepts. Both are social processes. Religious thinking follows from a critical examination of rituals no less than from historical narratives of revealing experiences. The observational data of science may be infused with historical ideas, and limited by research habits. Barbour finds pragmatic elements in decisions between conflicting doctrines in either science or religion.

The book discusses the chaos theory and complexity theory as well as the grand conceptual schemes of relativity and quantum theory. There is a competent discussion of the Pauli Exclusion Principle and Bell's Theorem experiments. Considerable attention is given to the so-called Big Bang in relation to anthropic principles. On another front, some of the current controversies concerning the status of experience and of the mental in general are given close attention. The various efforts converge upon an informal unification of fundamental concepts in science and religion. Barbour does not state that a theological argument from design is currently a live option, in William James's sense of the term. In the opinion of this reviewer, some such conclusion is nevertheless among the possibilities taken seriously by the author.

The scope of the book is tremendous. While few critical readers will agree with all its conclusions and suggestions, most will agree that the work deserves a large measure of respect because it offers promising points of departure for analytic and constructive work towards a completion of a unified process for philosophy of science and religion.

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The Marriage of Sense & Thought: Imaginative Participation in Science

by Stephen Edelglass, Georg Maier, Hans Gebert, and John Davy. Hudson, NY: Lindisfarne Books, 1997, xi + 146 pp., \$16.95, (p). ISBN 0-940262-82-7.

The Marriage of Sense & Thought is a must-read for anyone interested in the practice of science. This includes scientists, of course, but also lay persons interested in epistemology — how we know what we know, and the nature of “knowledge.” The book was first published four years ago as *Matter and Mind*; this revision represents a second edition. Both editions are subtitled “Imaginative Participation in Science,” and this subtitle hints at the book's content. The four authors are experienced scientists and educators, whose views have been strongly shaped by, among other things, Goethe's scientific works and the scientific and educational approaches of Rudolf Steiner.

While Goethe is better known for his artistic endeavors, he created a scientific approach that was significantly different from the prevailing approach of his (or our) time. The “modern scientific” approach, following Descartes' model, emphasizes the difference between two sources of knowledge — external observation and internal thought — in an attempt to distinguish that which is “objective” (and therefore “desirable” and “trustworthy”) from that which is not. Indeed, the “detached observer” is the ideal to which many scientists aspire, and it arises from a “materialistic” world-view that does not consider or embrace anything not rooted in “external” (physical) space. In contrast, Goethe contended that there is only one source of knowledge — experience — and that this includes both observation and thought. For example, to Goethe, there was no distinction between consideration of a single plant or the idea “plant,” because the archetypal or “ideal” representation of “plant” was as “observable” or “perceptible” — and thus real to him — as any actual plant. The Austrian scientist, philosopher, and educator Rudolf Steiner significantly extended Goethe's approach, describing the process of observing phenomena and thinking about them as perception and conception, whose union represents reality. The authors contend that this “marriage of sense and thought” requires imaginative participation in science. Thus, the authors argue, the so-called ideal of the detached observer is neither achievable nor desirable, and that “choosing to limit science only to those experiences that are measurable is a