

Guest Editor's Introduction

Over the last twenty-five to thirty years, an awareness of the limits of Enlightenment rationalism and the Cartesian/Newtonian paradigm for thought has been developing, not only among deconstructionists, but among philosophers of science and philosophically minded scientists. The belief that one could construct or derive a purely objective, neutral, bias-free, and rational perspective on any subject of discourse is now coming to be seen as a dream forged in the myth that there exists an ahistorical reality. In fact, all thought is contextual, and therefore all facts are value laden. Facts are contextual truths that arise precisely through a framework of interpretation that allows raw data to be connected for the construction of meaning. This assertion does not mean that there is no truth, but only that the true, like the real, is always encountered from and defined by a particular perspective. The task now is, not to deny perspective and context in thought, but to become more inclusively aware of what actually informs one's thought. This critique allows for a constructive engagement between science and religion that has not existed since the time of Descartes.

Ian Barbour has been a pioneer in the reclamation of this connection as well as the connecting of fact and value through his work in relating science and religion. He is indeed the epitome of a modern rarity: a scholar with both breadth and depth of comprehension and insight. His communicative clarity has enabled generations of students and scholars to benefit from this understanding. He writes about complex issues in a manner accessible to the nonspecialist—and in a way that illuminates the importance of the science-religion dialogue for matters of faith and understanding.

Ian Barbour is, quite literally, a founder of the emerging field of science and religion, contributing not only encyclopedic understanding and fair, insightful scholarship but also a firm conviction in the importance of religious belief within contemporary society. He has been simultaneously a professor in the Department of Religion, a professor in the Department of Physics, and Winifred and Atherton Bean Professor of Science, Technology, and Society at Carleton College, Northfield, Minnesota. His scholarly expertise is enormous, ranging from his own formal training in physics (Ph.D., University of Chicago) and theology (B.D., Yale University) to understanding in the other physical and social sciences as well as a firm commitment to environmental ethics. His constructive analysis of the role of interpretation in both science and religion, *Myths, Models and Paradigms*, (1974) was nominated for a National Book Award. An invitation to present the Gifford Lectures (1989–1991) not only demonstrated significant international recognition of his scholarship but also provided an opportunity for him to pull together a lifetime of reflection on the relationship of science and religion and of technology and ethics. The resulting volumes will benefit generations of scholars to come.

In 1993 the American Academy of Religion awarded Professor Barbour's

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Gifford Lectures the Award for Excellence in Scholarship in Religion. It is the highest scholarly publication award that the society bestows. As further recognition of this work and to provide an opportunity for scholars in the field to respond to it, the Theology and Science Group of the American Academy of Religion held a symposium at the annual meeting of the American Academy of Religion in November, 1994, in Chicago. At two sessions—one for each volume of the lectures—scholars presented their responses, expressing appreciation for Professor Barbour's work and also raising points of difference and issues for further exploration. Barbour responded to the critiques, and those responses also are contained in this issue. One paper included here was not presented at the symposium: Robert Stivers's article was solicited later to provide critique of Barbour's discussion of environmental issues in Volume 2.

In his scholarly work, Ian Barbour has always striven to keep theory and practice (*theoria* and *techne*) together. He understands that the technological application of scientific theories is where science has its most direct impacts upon the average person—and upon the wider society and the environment. From the beginning of his career he has been concerned with the translation of scientific ideas into technological artifacts and has encouraged ethical reflection on this transition. Accordingly, the first round of Gifford Lectures, *Religion in an Age of Science* (1989–1990), was devoted to the theoretical relationships between science and religion, including methodology, and to the philosophical and theological issues involved. The second round, *Ethics in an Age of Technology* (1990–1991), was devoted to the ethical and practical significance of these theories in technological applications.

Religion in an Age of Science builds upon Barbour's earlier works, especially his groundbreaking work *Issues in Science and Religion* (1966) and *Myths, Models and Paradigms* (1974). In these works, Barbour argues for the positions of "critical realism" and process thought and delineates the function of metaphors, models, and paradigms in theory construction. These positions are further refined in the Gifford Lectures, and it is these areas that both Nancy Murphy and Sallie McFague address, focusing on Part 1, "Religion and the Methods of Science."

Nancy Murphy, while deeply respecting Barbour's position of critical realism and his discussion of parallels between science and religion, wants to discuss the "scale" at which parallels are drawn, raising the issue of the *social embodiment of traditions* in both science and religion. Employing Imre Lakatos's concept of scientific "research programs," she argues that theology, rather than religion, is the appropriate theoretical scale at which parallels should be drawn to theories in science, because it is at the scale of theology, not religion, that theory construction takes place. Murphy thinks that such appropriate scaling of comparisons would prevent category mistakes and also allow for constructive interaction between sociological accounts of knowledge and other epistemologies, such as critical realism. She therefore encourages Barbour to take more seriously the social character of theory construction.

Sallie McFague, while affirming the value of metaphors and models for theory construction, raises issues of objectivity and diversity, particularly as addressed from within what she calls the "modernist" paradigm. Drawing upon feminist critiques of objectivity, McFague encourages Barbour

to take more seriously the impact that various gender and social locations have on thought, including scientific analysis, so as to reveal the current myopia and oppressive nature of science. This critique could well broaden science and open it out to a more inclusive sense of reality involving our embodiment in the natural world. How to achieve a unified worldview in the context of rising centrifugal forces of diversity is McFague's final issue. She believes that such a worldview cannot be found within the modernist paradigm alone, and so she calls for a more "particularist" perspective from which the whole is to be viewed. Ian Barbour's work provides some glimpses of such a new vision, especially in an ecological perspective.

Physicist and theologian Robert John Russell focuses on Part 2, "Religion and the Theories of Science." After briefly responding to Barbour's discussion of quantum theory, relativity, and thermodynamics, Russell devotes more extended treatment to cosmology (issues of design and origins) and evolution (avoiding incipient deism). Regarding design, Russell believes that the anthropic principle and the many-worlds response can be placed in dialectical relation, so that the laws of nature may be seen as not only descriptive but also prescriptive. In relating contingency and design, Russell wants to create a typology of kinds of contingency, including ontological, existential, and nomological, in order to claim that "the existential character of the universe is contingent, but the contingency is constrained by the co-determination of its global and local character." In regard to the question of origins and the beginning of time, Russell points to the influence on Barbour's work of neo-orthodoxy, which makes a strict dichotomy between "ontological" and "historical" origination and understands only the former as a legitimate concern of theology. Russell seeks to move beyond this position by rejecting the dichotomy and interpreting the doctrine of *creatio ex nihilo* in terms of a Lakatosian research program which allows the relating of these forms of origination. Finally, on evolution, Russell seeks to avoid incipient deism by seeing causality as not only "top down" but also "bottom up." Drawing upon quantum mechanics and the indeterminism of nature, Russell seeks to affirm that God may act in specific events in the evolutionary process. Thus, he tends toward a process metaphysics.

John B. Cobb, Jr., who responds to Part 3, "Philosophical and Theological Implications," is pleased with the degree of affirmation of process thought in Volume 1. He finds it encouraging that someone so conversant with the physical sciences also finds the Whiteheadian perspective meaningful and useful. The problem that concerns Cobb is that certain metaphysical assumptions, which have had negative consequences, are uncritically built into the categories employed by mainstream scientists, especially physicists. Barbour is an example of a clear alternative in the metaphysics of physicists. It is here, however, that a small difference emerges: Cobb sees process metaphysics as the "whole" from which he views the other parts, such as science and theology, while for Barbour process thought is useful for addressing certain problems in science and religion. Cobb is concerned about the role of perspective in Barbour's work as in the *whole of scientific analysis*. The unchallenged status of metaphysical assumptions in methodology may exert a determining effect on scientific results.

Like its companion volume, *Ethics in an Age of Technology* clearly builds

on much of Barbour's previous work, especially *Science and Secularity: The Ethics of Technology* (1970) and *Technology, Environment and Human Values* (1980). Roger Shinn, who focuses on Part 1, "Conflicting Values," addresses the two broad areas contained in the title of this volume. He sees ethics and technology as giving rise to two different kinds of ethical problems. In the first sort of problem the ethical demand is clear, and then it is a matter of whether an individual or a society has the courage and conviction to act responsibly. The second sort of ethical problem is more vague; it involves a social construction (such as technology) in which the good and the right are not easily known and must be searched for. Although Barbour is mindful of the first problem, he especially focuses on the second, where "technology ceaselessly impinges on ethics" and forces distinctions between need and greed. Shinn may see these problems as a bit more intractable and the world a bit more jumbled than Barbour does.

Robert Stivers, focusing upon discussions of environmental issues in Part 1, addresses the impact of technology on the environment, distinctions between nature and culture, hierarchical thinking, and challenges to sustainability. While he understands Barbour to maintain a modest "biocentric ethics" as a way to reconcile technological programs with environmental concerns, Stivers sees this approach as too anthropocentric. Ultimately, Stivers sees the problem as a "clash of worldviews" requiring a much more radical biocentrism. Stivers also raises the question of "social location" in environmental ethics, especially when primary ethical perspectives are anthropocentric rather than ecocentric. Anthropocentric ethics may undergird hierarchical thinking that "legitimizes" environmental exploitation—and may eventually jeopardize the very sustainability of the society doing the ethical reflection. Although Stivers agrees substantially with Barbour on most of these issues, he calls for Barbour to include more of the feminist and liberation perspectives in his work so as to confront ideological bias and promote greater integration in ethical reflection.

Mary Gerhart, who focuses on Part 2, "Critical Technologies," affirms the balanced summaries and connections that Barbour makes between ethics and technology. She argues, however, that the volume gives only superficial treatment to gender issues, is too focused on geocentric concerns, and thus does not offer a fully developed model for the future of technology in all its manifestations. While these volumes can be seen as an indispensable overview, to Gerhart they are unnecessarily difficult to read because they are of mixed genre. They treat neither science nor religion, neither ethics nor technology, but their effects. She seeks the theoretical connection between Volumes 1 and 2 and does not find it, and so she finds it difficult to assess the material.

Frederick Ferré is more appreciative of Barbour's work in his assessment of Part 3, "The Future of Technology." While he affirms Barbour's solutions and dreams, Ferré sees them as bordering on "impossible dreams" unless ways can be found to effect social change. He believes such change is both pushed by material expressions of technology and pulled by greater human values. Desirable social construction involves both, and the course of historical change can be affected by the poles of both efficient and final causation. Hope can act as final causality if it is clear and luminous enough. For these reasons he "would have liked Barbour to have

been even more visionary, freer in his speculations toward the attractive postmodern order of things for which he rightly yearns.”

I would like to conclude this introduction on a personal note.

I first encountered Barbour’s work in the stormy year of 1968. A college sophomore at the time, studying physics and philosophy, I was struggling to comprehend the forces swirling about me. Into the vortex of that chaotic year his work came like a compass, providing direction and guidance. Not only was he able to speak in a language intelligible to scientists, but he did so without rejecting religion or the Christian community of faith. He demonstrated that fact and value must never be severed—and that ethics, the environment, and technology were not incompatible. Ian Barbour has been an intellectual mainstay whose work has encouraged us all in the effort to keep the postmodern relationship of science and religion from fracturing into factionalism or fanaticism, encouraging rather the quest for vision and insight to hold the critical masses together.

—Ernest L. Simmons, Jr.