

BOOK REVIEWS

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Beyond the Big Bang: Quantum Cosmologies and God.

Willem B. Drees. 323 pp. Open Court, La Salle, IL, 1990. Price: \$38.95 (cloth) ISBN 0-8126-9117-2; \$17.95 (paper) ISBN 0-8126-9118-0. (Reviewed by Yuri V. Balashov.)

How should theology relate to science? And how should science react to the attempts of some theologians to bridge the gap between the two fields? The majority of practicing scientists have little or no concern for—and (sometimes) little patience with—metaphysical, not to say theological, issues of scientific inquiry. Yet science and theology coexist in one world, thus making mutual disregard inappropriate as a permanent stance. In Willem Drees' words, theology, in entirely separating itself from science, "runs the risk of becoming irrelevant." On the other hand, theology, if it were to submit itself completely to science, would share in the tentative, imperfect, and falsifiable character of the latter, running the risk of becoming simply refuted. Quite a number of books have appeared recently that aim to steer a middle course between these opposites. The reasonable solution, however, appears to lie outside them, rather than in between.

Drees' approach is based on adherence to what he calls the *constructive consonance*: "Consonance, because humans desire integration, or at least coherence ... Constructive, because the harmony is not readily found, but, like all human knowledge, is a construction" (p. 157). The last point is important. Not every kind of theology would be suitable for constructing a consonance with science. Certain theologies unreasonably assume a consonance from the very beginning, as a sort of preestablished harmony to be discovered later by humans. Such a *descriptive* consonance is based upon the strong realistic-referential view of knowledge and presupposes God's *presence* in the world "shining through" and thereby sanctioning broad parallels between religious beliefs and scientific facts, as referring to something out there. Drees shows that this project fails. As science develops, alleged parallels become refuted, which puts the entire theological enterprise into fatal danger. A genuine theology must be neither discovery, nor revelation, but a construction, like all intellectual endeavors. It should be compatible, in the broad sense, with a developing science, with all its diversity of approaches and research programs, but, at the same time, theology should preserve a "prophetic" distance from science, assuming existential aspects of human life, like the experiences of injustice and imperfection, as apparently suggesting the *absence* of God from the world. This line of thought does not lead to atheism but provides room for a truly *transcendent* God. And theology, thus constructed, has a chance of being incorporated into an overall complex network of concepts about the world, including scientific and metaphysical elements. The latter may be used to express the meaning of theological concepts in scientific context. And the coherence and pragmatic effectiveness of the resulting structure can add to its credibility.

Drees does construct such a structure by focusing on cosmology, a frontier of current inquiry, and naturally a context for many issues of philosophical and theological import, like *creatio ex nihilo*, contingency/necessity of the Universe, the perspectives of complete explanation, etc. The author is equally well at home in physical cosmology and theology, which enables him to proceed first from the former to the latter (Part I) and then the other way round (Part II), demonstrating the constructive nature of the supposed consonance at work. The conclusion is that modern cosmology cannot serve as a forum for the apologetic theological activity practiced by some scholars. But, at the same time, cosmology does not exclude the belief in God, provided the assumption of His apparent absence from the world is taken as a necessary prerequisite of reasoning.

Indeed, as Drees shows, all simplistic ways of relating the standard Big Bang theory to Christianity are entirely inadequate. This concerns, for example, the alleged identification of the Big Bang with *creatio ex nihilo*. Though the standard classical (nonquantal) cosmological models suggest a "beginning" a finite time ago, the scope of the theory does not reach the moment of "creation" itself. As one approaches the singularity, all classical notions, including that of the before/after temporal relation, break down. The author then turns to the recent nonclassical extrapolations of the Big Bang theory, such as Linde's chaotic inflation, Penrose's time-asymmetric cosmology, and the Hartle-Hawking proposal for the wave function of the Universe. The result is that the "no-boundary" condition of the latter makes time a phenomenological parameter with no edges and hence no place for the creation *event*. However, the idea popularized by Hawking himself that his cosmology leaves no room for the Creator is, according to Drees, based on the oversimplified, deistic notion of a Creator. "one might understand God as sustaining the world at every moment. Any transcendence beyond the Universe must be understood as related to all moments, and not as especially related to an initial moment" (p. 10). This timeless perspective is consonant with both the Augustinian view of time as created on a par with the Universe and also with God apparently distant from, but "elusively present" in, the world as a whole.

Another theologically relevant issue is that of contingency. Why does the Universe exist at all? "Creation from nothing" in quantum cosmologies appears to speak in favor of God's making the Universe out of grace. Drees argues, however, that the notion of "nothing" in the recent models is metaphysically incorrect in that it implicitly presupposes some preliminary "input of reality." On the other hand, all our theories are bounded in the conceptual space, beyond which there is a place for a transcendent, boundless being. All in all, there is no way either to derive a definite God from science or to discard Him, using arguments based on science. The viable alternative is to *construct* a "consonant God" (a) compatible with science; (b) at the same time bearing a distance from it; and (c) rooted in human strivings after justice and perfection.

Returning to cosmology, I cannot help drawing attention to a very good account of cosmological matters made by Drees without a single formula. His exposition of the Hartle–Hawking timeless cosmology is, to my mind, even clearer and more visual than that given by Hawking himself in his wonderful book.

There is one point on which I am in strong disagreement with Drees, namely, regarding his qualification of the weak anthropic principle as trivial and devoid of explanatory power. In fact, its explanatory power has been demonstrated in several works.¹ The idea, apparently overlooked by Drees, is that taking into account the selection effect related to the fine tunings of physics necessary for our existence as observers of some states of affairs may contribute to the choice between competing explanations of this state of affairs. This is anything but trivial.

To resume, the book is well worth reading. Though it was primarily a doctoral thesis by the author, it has no specific dissertation flavor about it. It is skillfully written and thoroughly structured, with a definite position specified at the very beginning. No background in theology or

cosmology is assumed of the reader. The book should be read by theologians, especially by those wishing to become informed of the recent developments in theoretical physics and cosmology. It should be read also by physicists, who may well come to the conclusion that, to a considerable degree, theology is a rational enterprise. And, of course, the book is recommended to anyone interested in the constructive nature of human knowledge.

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¹See, for example, B. Carter, *Philos. Trans. R. Soc. London Ser. A* **310**, 347–363 (1983); V. A. Rubakov and M. E. Shaposhnikov, *Mod. Phys. Lett. A* **4**, 107–109 (1989); M. E. Shaposhnikov and I. I. Tkachev, *Mod. Phys. Lett. A* **5**, 1659–1662 (1990); D. W. Sciama, in *The Anthropic Principle*, edited by F. Bertola and U. Curi (Cambridge U.P., Cambridge, 1991), pp. 109–112.

Controlling Technology: Contemporary Issues. Edited by William B. Thompson. 465 pp. Prometheus Books, New York, 1991. Price: \$21.95 ISBN 0-87975-616-0. (Reviewed by John G. Truxal.)

With the current, rapid growth in undergraduate courses on technology within the liberal arts curriculum, this book is a welcome collection of essays on the problems and opportunities resulting from the modern technology that provides us the unprecedented chance to control the future environment. Professor Thompson has selected 33 essays from authors with a wide range of viewpoints on the definition of technology, the degree to which technology is autonomous, and the political problems associated with control over technological development.

The book includes a sampling of the readings commonly found in science/technology/society (STS) courses, particularly those offered by Arts and Sciences faculty. Thus we have Jacques Ellul's "Defining Technique" and "The Autonomy of Technique," but also contributions by Samuel Florman and Melvin Kranzberg.

This reviewer was particularly pleased to find presentations of very specific technologies: Jack Beatty's article on the role of bureaucratic organization and NASA language in the Challenger disaster; Arnold Pacey's article using the snowmobile as a specific example to illustrate the impacts

on very different cultures; and Dorothy Nelkin's use of controversies over siting of a nuclear plant in upstate New York and expansion of Logan Airport. Engineers like to work from the specific toward the general, and the book provides ample materials for this approach.

Professor Thompson has carefully avoided essays in which detailed technical content demands unusual reader background. He introduces each of the eight major sections with a brief content overview (largely without personal interpretation). Unfortunately, he does not give the reader any biographical background on the authors, so we have no basis for understanding the biases and platforms from which they write.

As an engineer, I am amused by one statement in the Preface: "Some of the more seminal, *if less careful*, thinking has been done by those outside the discipline of philosophy." (Italics mine.) I suppose each of us thinks that his/her discipline has a corner on "careful thinking."

I found this a superb collection of essays, entirely appropriate for an STS undergraduate course.

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