# *Reviews*

## VAN HUYSSTEEN RESPONSE TO ROBBINS: DOES THE POSTFOUNDATIONALIST HAVE TO BE A PRAGMATIST?

I am indebted to Wesley Robbins for his careful and probing review of my book *Theology and the Justification of Faith: The Construction of Theories in Systematic Theology* (27/2, June 1992), and also to the editors of *Zygon* for inviting me to respond. I see the heart of the matter and the core of our eventual differences as follows: Robbins and I both opt for a postfoundationalist holism, he for pragmatist reasons and I for reasons determined by a fallibilist, experiential epistemology. Robbins applauds this holism but then sees it waver and backslide because a commitment to Christian faith apparently necessitates the postulate of a correspondence between words and reality. For Robbins, this goes hand in hand with Christian theist/realist claims which, according to him, have already caused more trouble than they are worth. Robbins, therefore, projects life without this belief and justifies this pragmatist commitment by its ultimate usefulness.

Robbins's critique eminently focuses the complex challenge of postmodern thought to a theology that wants to move beyond the insular comfort of epistemological foundationalism. Not only do we have to take seriously the postmodern trilemma of trying to keep together, in a meaningful whole, a sense of continuity with the Christian tradition, a respect for and celebration of pluralism, and a resistance to any authoritarian (also epistemological) domination (cf. Mark Kline Taylor, *Remembering Esperanza: A Cultural-Political Theology for North American Practice* [New York: Orbis, 1990], pp. 31ff.). Postmodern thought also challenges us to again explore the presupposed continuity between Christian theology and the general human enterprise of understanding the world rationally. Much of contemporary theological reflection has in fact been shaped decisively by postmodernism's fragmentation, indeterminacy, and intense distrust of all universal or "totalizing" discourses (cf. David Harvey, *The Condition of Postmodernity* [Oxford: Basil Blackwell, 1989], pp. 9f.). Not only theology, however, but also postmodern philosophy of science has moved away from conceptions of linear progress, absolute truths, and the standardization of knowledge. Joseph Rouse recently argued for a postmodern philosophy of science that, along with feminist readings of science, joins trust in local scientific practice with suspicion toward any global interpretation of science that claims to legitimize that trust ("The Politics of Postmodern Philosophy of Science," *Philosophy of Science* 58 [1991]: 607–27).

It is precisely in the light of this challenge that I want to develop a holism that is consonant with an experiential, fallibilist epistemology. This epistemology articulates and defends the cognitive claims of our religious beliefs, but not in terms of so-called universal standards of rationality. Of course, religious beliefs should not be treated differently from scientific,

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philosophical, or other beliefs. Epistemologically speaking, there is nothing unique about religious beliefs. Like other beliefs they can be assessed to determine whether they are useful, useless, meaningful, true, or false. And in the assessment of our beliefs, critical realism—at least in the sense that I have used this term—certainly rejects the "objectivity" of all metaphysical foundationalisms and aims for the truthfulness granted by intersubjectivity instead.

To reject foundationalism in theology is therefore not to embrace nonfoundationalism without any further ado—in any case, not a type of non- or antifoundationalism which claims that one can engage in theological reflection without paying attention to the epistemic values that shape theological rationality. Generally speaking, the nature of rationality consists of the intelligent pursuit of certain epistemic values of which intelligibility—the quest for understanding at the deepest possible level—is the most important. The source for this quest for intelligibility, however, is never only pragmatic but always also cognitive and evaluative as well (cf. Nicholas Rescher, *Rationality: A Philosophical Inquiry into the Nature and Rationale of Reason* [Oxford: Clarendon Press, 1988]). What this means is that also in postmodern theology we have good reasons for hanging on to our beliefs, good reasons for evaluating and assessing them in certain ways, and good reasons for acting in certain ways. Within a postfoundationalist, holist epistemology the three go together as a seamless whole and merge in the common task of uniting the "best reasons" for belief, action, and evaluation. For this reason, Robbins is not very convincing on the fate of theism: projecting a life on pragmatist premises alone (and thus eschewing the cognitive claims of religious beliefs and theological statements) not only fundamentally challenges his own holism when epistemology is finally emptied into pragmatist hermeneutics (cf. Robbins, p. 231: "Epistemology and successor disciplines like philosophy of science have nothing to say about that") but also illustrates that not all kinds of postmodernism should be accepted uncritically. Even pragmatism can conceal an oppressive neopositivist bias toward the cognitive claims implicit in religious and theological statements.

Behind this is Robbins's erroneous assumption that even a weak form of critical realism necessarily implies a strong correspondence theory of truth. But these two need not go together at all: the epistemic purpose of metaphoric language is not at all to transcend the world of human experience, but to set limits rather to the range of our language. Such limits establish a domain for human knowledge, and our subjective encounter of the world is therefore of the same order as our re-creation of the world in language. Our "words" are here not seen as a derivative of an "objective" world and consequently do not find truth in correspondence with such a world. This is not a denial of the existence of an extralinguistic world but is an affirmation of the reality of the world encountered in language. The epistemic implications of this fact are not "quite useless" (cf. Robbins, p. 231) at all but point to the fact that there is more to our religious and scientific language than just whatever happens to be useful to us (cf. Mark S. Cladis, "Mild-mannered Pragmatism and Religious Truth," *Journal of the American Academy of Religion* 60 [1992], in press). This implies, however, that all our beliefs—whether scientific, philosophical, religious, or atheistic—are very often justified on grounds other than their usefulness.

# CLAYTON RESPONSE TO ROBBINS: RELIGION/SCIENCE WITHOUT GOD?

J. Wesley Robbins is deeply opposed to my defense of theology as (in part) the study of whether God exists and how God is to be understood. As becomes clear in his conclusion, Robbins is a pragmatist who wishes to downplay or eliminate all truth claims about supernatural beings in favor of "self-reliance" and "the creative power of human language use." For him, the (only?) remaining question is whether religion is a useful or inutile practice. Obviously, one who holds this position will have little interest in exploring theology as an explanatory activity, the task addressed in my *Explanation from Physics to Theology*. More strongly, Robbins alleges that the book is inconsistent because it accepts a "holistic pragmatist account" of science (a position that he derives from W. V. Quine, Donald Davidson, and Richard Rorty) while remaining realist *at least regarding the intent or goal of theology*. (In this respect I would have thought that my position is somewhat more skeptical than Wentzel van Huyssteen's, although Robbins treats our views as virtually identical.) I thus contradict myself by going as far as Imre Lakatos in the direction of contextualism while still entertaining explanations that use the term *God* as a referring term rather than merely as a cultural artifact.

Unfortunately, Robbins misconstrues both the book's intent and the contemporary discussion. The holism or "contextualist shift" that I defend includes social and pragmatic features but does not entail conventionalism or the forsaking of any truth claims; this was the point of criticizing Jürgen Habermas's consensus theory as well as the conclusions of Thomas Kuhn and Paul Feyerabend. Robbins himself provides a thumbnail sketch of the antecedents to his own position (pp. 226–28), consisting of (1) logical empiricism (statements about "experiential contents" correspond to "the way the world in fact is"); (2) Quine and Davidson's critique of logical empiricism ("the unit of empirical inquiry is an entire array of sentences and not a privileged observational subset thereof"); and (3) Rorty's cultural relativism or "neopragmatism" ("the unit of empirical inquiry . . . is an entire culture, an array of practices that form a 'seamless web' that gets differentiated sociologically"). Neither Davidson nor Rorty wishes to dissolve the distinction between (2) and (3)—as evidenced by their heated interchanges at the University of Santa Clara conference on realism in February of this year. I attack (1) and defend (2); position (3) I find either incomprehensible or self-defeating.

I must be brief. Is a holistic epistemology in the sense of (2) in fact incompatible with explanations in terms of supernatural beings? There would certainly seem to be views of God in the Western tradition that are decidedly holistic, e.g., those that understand God as Being, as the Ground of Being, or as the (Neoplatonic) One beyond all distinctions. But we should give up the notion of language corresponding to the world, according to the neopragmatists, and hence *all* realist language about God. Is this conclusion persuasive? I have elsewhere explored the impact of the contextualist shift on the realism question ("Two Kinds of Conceptual Scheme Realism,"

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*The Southern Journal of Philosophy* 29 [1991]: 167–79; "In Defense of Regulative Realism," forthcoming in *Synthesis Philosophica*), arguing that the intentionality of realist language—in the present case, talk of a being *God*—is *not* necessarily eliminated even by relatively strong doses of contextualism.

Interestingly, pragmatists often remain realists about *some* types of language. This seems to be true of Robbins, since he speaks of "the world's operating selectively on our linguistic behavior, shaping it into rules of action that are more or less useful to us in coping with it." The pragmatist's criterion is how well a belief allows us to cope with the world—and Robbins apparently believes that we can sometimes tell whether a belief is being selected for or against. It appears, though, that this works *only in the natural sciences.* Robbins tells us, on the one hand, that the world shows "a relative strictness when it comes to physics," since it rules out some theories as unuseful; on the other hand, "there are no normative lessons to be learned from the touch with reality . . . [about] how theology should be practiced." In short, it is *Robbins's* holism that only goes partway, since it underscores rather than challenging the place of physics as the (only?) field where the world directly tells us what is useful. By contrast, my thesis was that such claims are no longer tenable in the context of our present hermeneutical understanding of science.

What is mystifying is Robbins's attempt to split the difference between realism and Rortyan antirealism. For Rorty "truth" and "the world" are themselves cultural artifacts; "worlds" are created merely for tactical purposes, and Truth need never impinge on what we wish to call true. For Robbins, by contrast, "the world has a say in how it gets talked about." At least sometimes, the world "operates selectively on our linguistic behavior"; Robbins even speaks of our "touch with reality"! Thus for him it's *not* the case that all questions are tactical; there are at least some ways of talking that are true or false. If so, how are we to decide exactly *which* these are? Does the world operate selectively in the case of natural scientific theories but not in the case of theories in the social sciences? Does it select against some views of human agents but have nothing to say about superhuman agents? Without assuming the very logical empiricism that he wishes to reject, it's hard to see how Robbins can make a case in principle against *any possible* input from reality regarding theological theories.

So let's imagine instead that Robbins means to be a consistent Rortyan and to give up all touch with reality. Then my interest in theology-science parallels becomes not an objective but a *tactical* mistake; it would be tactically better for me to draw parallels between theology and literary criticism. But this route also raises problems. For example, what does "tactically better" mean? On the one hand, it *sounds* like a truth claim (objectively speaking, Clayton is more likely to succeed if he argues as follows); but—again—if *this* is admissible as a truth claim, why not admit others? Moreover, if Robbins is claiming that it *really is* tactically better to link theology to literature, is he right? Will scholars take theology more seriously if it models itself on recent French hermeneutics (say, Michel Foucault and Jacques Derrida) than they will if I'm successful in establishing significant parallels with the sciences? Will nonscholarly readers respond in the same way? Neither of these predictions seems likely (though they could be researched). On the other hand, what's the status of Robbins's proposal if it

makes no claim to truth at all? Presumably it tells us what Robbins likes and dislikes. But then there's nothing left to say except that our tastes differ.

In a word: let's assume, as Robbins's pragmatic realism implies, that Rorty's more extreme epistemological skepticism—(3) above—is misguided (it's at least self-defeating as a philosophical position, though that doesn't bother Rorty) and that some truth claims are justified. Can a holistic epistemology (2) make progress in evaluating the claims of theology? Robbins thinks not. Perhaps it *is* impossible to evaluate them, but isn't it a bit too early to tell? We've only just shaken free from the fetters of logical empiricism (1), and we continue to be distracted by fideistic and pragmatist counterproposals. In a sense, then, we *haven't* yet tried evaluating systematic theological claims in a methodologically sophisticated manner. So let's not treat as a *fait accompli* the very task that currently deserves our most careful attention: how to proceed rationally with formulating and criticizing theological proposals.

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*Beyond the Big Bang: Quantum Cosmologies and God.* By WILLEM B. DREES. La Salle, Ill.: Open Court, 1990. 323 pages. $38.96; $17.95 (paper).

REVIEW BY ALBRIGHT

After completing a doctorate in theoretical physics, Willem Drees proceeded to earn one in theology. This book is his dissertation for the theological doctorate. When an author has a background so strong in both science and religion, one expects (and receives) accuracy and depth in both subjects. The book is not easy to read, but it has a user-friendly air to it that brings you pleasure even when you have to go back over a passage to review something because you missed a definition the first time around.

This review will concentrate on two of the most important sets of ideas that Drees considers. The first of these is consonance versus dissonance; the second is comparison of competing research programs in quantum cosmology.

As a leader in the science-religion dialogue, Drees is committed to the notion that science and religion are consonant rather than dissonant. His own theological stance is based on this attitude, as he explains in the latter part of the book. Consequently, the entire tone of the work should be congenial to a reader of *Zygon,* to the extent that some of his arguments may seem unnecessary. However, not everyone in the educated public shares this viewpoint; Drees is good at articulating why they ought to agree on the consonant position.

The pivotal contribution of this book is the comparison that Drees makes

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of three competing views of cosmology, identified with three contemporary theoretical physicists who have been working in this area: Andrej Linde, Stephen Hawking, and Roger Penrose. In each case there are others who have contributed importantly to the theories, so it is an oversimplification and an injustice to be limited to these three names. Drees has the other names and full references in his book, so they will not be reiterated here. All three research programs agree on certain presuppositions: (1) for large distances Einstein's general theory of relativity is the correct description of gravity; (2) for short distances and weak gravity quantum mechanics is correct; (3) the Einstein equations of general relativity contain *inter alia* a singularity (called the Big Bang) out of which flow space, time, and matter; the universe has been expanding ever since.

The difficulty comes about because there is not yet a coherent way of combining general relativity with quantum mechanics to form a single quantum theory of gravity. By contrast, Einstein's special theory of relativity was merged with quantum mechanics in a beautiful and fruitful way by Paul Dirac in 1928. In the absence of a beautiful and fruitful quantum theory of gravity, the cosmologist makes do with half-baked and controversial models of what the eventual correct theory will say when it is discovered.

Linde is one of the inventors of the inflationary universe idea: a very short time after the beginning, the universe expanded very rapidly in a way that is not manifestly in agreement with general relativity. Such a disagreement with Einstein is thinkable because the distances between small bits of matter were at that time so short that quantum mechanics was also very important, and quantum gravity is not yet understood. As one might expect, Linde's cosmology has inflation built into it in an essential way.

But inflation per se does not distinguish the three cosmological programs one from another. The real distinction comes from the initial conditions. What was it like in the earliest part of the history of the universe, when quantum gravity would be needed to describe what happened? How does the subsequent history of the universe display these early conditions? Linde envisions a chaotic condition, with many types of situations possible, most of which are actually realized in practice. Hawking denies that there was any initial state; his cosmology includes the Big Bang but also has time extending backward arbitrarily far. Penrose requires a very special initial state of the universe, coupled with a theory that is asymmetrical in time. Although Linde's cosmology has the greatest explicit need for inflation, the other two schemata do not rule it out. In the spring of 1992, microwave observations were reported indicating that the early universe was less homogeneous than had been thought, in a way that lends powerful support to inflationist cosmologies but does not distinguish among these three.

How does one choose among these prototheories? Given the present state of science, there is no objective way. How does one relate them to religion? Drees does this by comparing the modern scientific ideas with those of the great theologians, by examining such concepts as *creatio ex nihilo,* necessity versus contingency, and eschatology. He does much more than simply quote the great masters of the past; he provides his own theological syntheses and defends them with skill.

Whether or not you agree with all of Drees's theological positions, you

will find this book an admirable and useful reference to guide you through a set of difficult but important concepts. It is a fine addition to the intellectual scene.

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## REVIEW BY VAN TILL

Questions regarding the realtionship of science and theology continue to provide the occasion for both cooperative dialogue and contentious debate. In *Beyond the Big Bang,* Willem Drees seeks in a positive way to provide theologians and scientists with the resources to interact with one another in a respectful and informed manner.

Drees approaches this project with appropriate credentials. Trained in both physics and theology, he is currently on the staff of the Interdisciplinary Center for the Study of Science, Society, and Religion at the Free University of Amsterdam.

Although the book does not demand a familiarity with the contemporary scientific jargon (brief introductions to the principal theories and concepts relevant to contemporary cosmology are conveniently provided in an extensive appendix), it is clearly directed toward those persons who are familiar with recent discussions in the arena where science, theology, and philosophy interact. For this audience Drees offers a candid critique of some of the shallow rhetoric that often appears in popularizations of scientific cosmology, and he removes the scientific mask from essentially religious and metaphysical statements often found in such works.

Drees offers this volume as a first step toward his goal of developing a theological position in "critical coherence" with the scientific enterprise. He calls his approach *constructive consonance*—the "constructive quest for consonance between our knowledge of the world through the natural sciences and an adequate theology" (p. 7). Contrary to the spirit of contemporary naturalism, Drees is firm in his conviction that "theology need not be discarded as a prescientific attempt at explanation which has lost out to science. . . . Rather, theology can take up the language of science to express and develop the meaning of theological concepts" (p. 9).

The book is divided into two parts of three chapters each. In Part I, Drees critiques several commonly suggested ways of relating Christian theology and the Big Bang theory. The diversity is remarkable. While some creationists reject the Big Bang theory for its lengthy time scale and its concept of formation by process, some proponents of naturalism (like Fred Hoyle and Hannes Alfvén) reject it "because to them it looks too much like creation" (p. 22). Drees pays particular attention to what he judges to be three inadequate ways of relating Big Bang cosmology to Christian belief: (1) warranting cosmological arguments for God's existence; (2) claiming parallels with the biblical creation narratives; and (3) claiming parallels with the doctrine of *creatio ex nihilo.*

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In the chapter "Quantum Cosmologies and the Beginning," Drees offers his critique of the philosophical elements of the cosmological theories developed by Andrej Linde, by J. B. Hartle and Stephen Hawking, and by Roger Penrose. Of particular importance, in my judgment, and applicable to all Big Bang theories, is Drees's development of these two points: (1) as a scientific concept, the Big Bang theory is necessarily limited to a description of the temporal development of *something;* it cannot speak to the transformation of a true *nothing* into this universe; (2) a clear distinction must be maintained between the concept of a $t = 0$ moment of origination and the theistic theological concept of God's sustaining the universe in being at *all* moments. In making these points Drees provides a welcomed contrast to those popularizers of Big Bang cosmology who have muddied the waters of discourse with careless rhetoric about "scientific explanations of creation from nothing," or "nothing for a Creator to do," or "What place, then, for a creator?"

In recent years we have become increasingly aware of numerous "anthropic coincidences"—particular features of the universe that are essential to the development of life, especially human life. Some writers have extrapolated from these coincidences to "anthropic principles," often offering them as scientific substitutes for the religious belief that these features are manifestations of the Creator's thoughtful intentions. Drees, on the other hand, argues that these anthropic principles "are not results from science, unlike the coincidences on which they are based. Rather they are metaphysical ideas expressed in scientific language" (p. 10).

Some Christian apologists have sought to employ the coincidences in modernized Paleyan design arguments for God's existence and creative activity. Drees, however, argues that such a strategy will not work. Instead of moving from coincidences to God, Drees prefers the reverse. "Once one has a theological understanding of reality, the anthropic coincidences can be seen as expressions of God's providence" (p. 89).

To summarize part I, Drees finds Big Bang cosmological theorizing to be religiously inconclusive. "There seems to be no strong basis for an argument from the theories of scientific cosmology to God, whether from the beginning, or from the anthropic coincidences, or from the contingencies of the laws or the initial conditions, or even from the contingency of existence. The opposite, a clear argument against God, is not supported either" (p. 106).

In the second part of this work, "Constructing Theology in a Scientific Culture," the author presents his own strategy. He begins with a chapter entitled "Eschatology and the Cosmic Future," in which he expresses a desire to develop "an understanding of reality which is adequate with respect to science and to the theological function of eschatology, capable of expressing the concern for justice and love" (p. 121).

But how do we get *personal* concerns out of scientific cosmology? What does such theorizing have to offer with regard to questions about justice, love, morality, theodicy, and the like? Perhaps here is where the difference between science and theology is most apparent. After critiquing a number of highly speculative visions extrapolated from Big Bang theorizing, Drees concludes (and I heartily concur) that scientific cosmology has nothing to offer toward the *substance* of these issues, but that it does offer a "conceptual space" that may be useful in some discussions.

In the chapter "Theology and Science: Relationships and Methods," Drees begins with a critique of several strategies for relating the scientific and theological enterprises. He follows this with an outline of his own "constructive consonance" approach. An important first step, says Drees, is to recognize that an adequate theology must include not only the worldview or structural concerns of theistic metaphysics, but also the existential concerns of human life—justice, love, etc. Going beyond generic theism, theology must provide a way of understanding the full spectrum of life's experiences. But late-twentieth-century life experience includes a significant contribution from the natural sciences. Furthermore, whether one is doing science or theology, it is imperative, says Drees, to recognize the formative role of metaphysical presuppositions. Hence, any meaningful interaction of science and theology must include a conscious concern for metaphysics.

But all three—science, theology, and metaphysics—are inherently *constructive* enterprises. The chief activity in each is to make assumptions and to *construct* theories relevant to the phenomena under consideration. Why expect *consonance* among the various elements of the larger picture? While human desire for integration may indeed play a role, Drees would also argue that "belief in God as the One suggests a certain harmony between ideas about the relation between God and the world and the scientific knowledge of that world" (p. 157). But even this harmony is not *found* but *constructed* as science, theology, and metaphysics work in respectful interaction.

The final chapter, "God," strikes me as the beginning of a long-term project, with the bulk of the work yet to be done. Following his own advice, Drees seeks to construct some of the elements of his theology within the conceptual space of modern science, while at the same time calling attention to the boundaries of that space. In a reminder to scientists, Drees notes that Big Bang cosmology cannot explain the origin of the universe from nothing. "Even the most extreme 'nothing' of the physicists is not an absolute Nothing devoid of any properties or measures. . . . The mystery of existence is unassailable. It remains possible, therefore, to understand the Universe as a gift, as grace" (p. 192). In a statement directed more toward theologians, Drees says that "*Creatio ex nihilo* should not be understood as referring to an event of origination, for that is not in line with contemporary cosmology. . . . *Creatio ex nihilo* should be understood as applying to all moments of time, not just a first moment" (pp. 203–4). Drees is not the first to say these things, but in the context of contemporary discussion they bear repeating.

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*Divine Nature and Human Language: Essays in Philosophical Theology.* By WILLIAM P. ALSTON. Ithaca, N.Y.: Cornell University Press, 1989. 279 pages. $34.95; $12.95 (paper).

*Epistemic Justification: Essays in the Theory of Knowledge.* By WILLIAM P. ALSTON. Ithaca, N.Y.: Cornell University Press, 1989. 354 pages. $44.95; $15.95 (paper).

Those familiar with the influence of William Alston on philosophy of religion and epistemology will soon recognize the value of these two volumes. Both collections of Alston's own essays, they illustrate the consistency of rigor with which Alston tackles philosophical problems, as well as the consistency of his position. The first brings together articles, all written since 1980, on various aspects of language about God (metaphor, literalness, reference), God's nature (foreknowledge, belief, immutability, simplicity), and God's relation to the world (morality, spiritual development). The second volume of essays, with the earliest piece written in 1971, deals with foundationalism, epistemic justification, internalism, externalism, and self-knowledge. In both works, the introductions help to delineate Alston's overall picture of his subjects—God, language, and epistemology.

General features of Alston's positions quickly surface. First, and perhaps foremost, is his realism in matters both theological and epistemological. An illustration of the former is Alston's commitment to a literal core of meaning with regard to talk about God. The latter appears in the externalist aspect of his epistemology, namely, that there must be a reliability constraint on epistemic principles so that when engaging in our epistemic practices we generate mostly true beliefs rather than false ones. A second general feature is Alston's antiscientism and antipositivism, illustrated by his willingness to take seriously the questions of the skeptic. He is clearly not a Wittgensteinian, for although the limits on our epistemic access to the world may make us "epistemologically humble," we still have access. Alston's emphasis on the multiple sources of belief and, in particular, religious belief, is the third general feature of the works. Influenced here by common sense, realist philosopher Reid, and, to some extent, by a nonpositivist reading of Wittgenstein, Alston encourages a broad approach to epistemic justification, including argument and many types of experience.

Alston says of his positions in philosophical theology that they take a middle way. This can easily be extended to both works. Taking neither obscure nor radical positions, Alston's writing in both epistemology and philosophical theology is commonsensical. Examples from each illustrate this point. In *Epistemic Justification,* Alston argues for an internalist externalism about epistemic principles. He carefully spells out different kinds of internalism: perspectival, accessibility, and consciousness. The first claims that what justifies one's beliefs can only be "what is within the subject's perspective in the sense of being something the subject knows or justifiably believes" (p. 233). The second suggests that what justifies can

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only be "that to which the subject has cognitive access in some specially strong form" (p. 233). The third holds that only "those states of affairs of which the subject is actually conscious or aware can serve to justify" (p. 233). The first of these conceptions of internalism he rejects, for it relies on a deontological account of justification that too strongly assumes that we have voluntary control over our beliefs. The third he rejects since it requires an infinite regress of justification. The second is Alston's chosen position, but even here he proposes a very weak accessibility constraint so as to rule out neither beliefs we typically take to be justified nor beliefs we typically take to be rational. On the other hand, the externalist aspect of his approach claims that "it is both necessary and sufficient [for what constitutes an adequate ground of belief] if the world be such that the ground be sufficiently indicative of the truth of the belief, both necessary and sufficient that this actually be the case, and neither necessary nor sufficient that the subject have any cognitive grasp of this fact" (p. 244). Thus he combines what he takes to be the truth of two quite different positions into a middle way.

In *Divine Nature and Human Language,* the middle way also emerges in a number of instances. Alston argues in the first section that although we can make literal claims about God, we cannot do so in such a way that all the details are known. For example, in "Functionalism and Theological Language," he suggests that "the common possession of abstract features is compatible with as great a difference as you like in the way these features are realized" (p. 66). Thus, a computer and a new acquaintance can both be "intriguing," where the term is used with one sense, but where what makes one thing intriguing is quite different from what makes the other so. And so with God. God might be able to make something, as we humans do, and yet not *do* so in any way like the way humans do. A second example comes from a later essay where Alston compares the Thomistic and Hartshornean positions on attributes of God and attempts to keep the best of both. Hartshorne rejects the Thomistic proposal altogether, for he reasons that this position requires that one understand the attributes to be logically interconnected. Breaking the attributes into two groups, Alston argues that Hartshorne's arguments linking them are faulty and suggests a "mixed" conception of the attributes made up of Thomistic (classical) and Hartshornean (neoclassical) attributes.

The books may be disappointing to readers outside the fairly narrow constraints of contemporary analytic philosophy because of the realist assumptions Alston makes. For example, theologians influenced by postmodernist considerations will find Alston's emphasis on literal talk of God to be either unacceptable, given the relativistic and pluralistic situation in which we find ourselves, or simply out of touch with contemporary theology. There may also be resistance to Alston's use of the technical terminology of contemporary analytic philosophy. Unless one is schooled in the terminology and its implicit distinctions and arguments, it may be difficult to see the larger painting for the dots of paint. On the other hand, for analytic philosophers, the discussions will not have this weakness. Alston has great breadth of knowledge in philosophy and draws on that knowledge to generate a tightly reasoned but measured approach to philosophical issues. His commonsensical but important distinctions need to be taken seriously, for they can help philosophers avoid certain problems that mark the philosophical map.

Philosophers of science, however, may find the works lacking a sensitivity to problems and developments in that field. Contemporary analytic epistemologists, including Alston, have not, perhaps, taken the findings of philosophy of science seriously enough, at least in terms of how those findings impinge on the theory of knowledge. The realism implicit (and explicit) in Alston's position is a large commitment for which the actual methodology of science may not allow.

Nevertheless, the two volumes are germane to the discussion of religion and science in a number of ways. Note, for example, Alston's comparison between the scientist's use of terms in technical yet literal senses and the theologian's capacity to do likewise (*Divine Nature,* p. 45). Also of interest is the antipositivistic, antiscientistic approach Alston takes. What does this entail for discussions of science and religion? Furthermore, the groundwork is laid, in these two collections, for a forthcoming monograph on the perception of God, in which Alston will be extending his already prolific contributions to that topic. He argues in essays already published but not anthologized in the two books being reviewed (see, for example, "Christian Experience and Christian Belief," in *Faith and Rationality: Reason and Belief in God* [Notre Dame: University of Notre Dame Press, 1983]), that the perception of physical objects and the perception of God are on equal footing epistemically. This position is to be further developed in the forthcoming book. Taken together, these two works and the third to come will provide much that is valuable for the discussion of the relationship of science and religion.

In short, these two volumes are well worth reading, even for those whose background in analytic philosophy may not be strong, for Alston's insights are helpful and his position moderate. Furthermore, the positions he takes here have an important role to play in his broader epistemology of religion, which is central to contemporary analytic thought on that matter. Alston's work should not be ignored.

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*Darwin on Trial.* By PHILLIP E. JOHNSON. Washington, D.C.: Regnery Gateway, 1991. 195 pages. $19.95.

Why the title "Darwin on Trial," and, particularly, why a posthumous trial? Since Darwin can hardly be faulted for doing more than anyone before him in trying to obtain information about the origin and diversity of life forms, what are the charges? This matter is clarified, when the author, Phillip E. Johnson, a professor of law at the University of California at Berkeley, explains, "[Since] my subject is not history, but the logic of current controversy . . . my interest must be in Darwinism and not Darwin" (p. 15). In other words it is Darwinism, *not* Darwin, on trial.

Johnson then proceeds to summarize Darwin's three main propositions.

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In a word, they are: (1) species are not immutable; (2) all living things descended from a small number of common ancestors; and (3) the whole evolutionary process was guided by natural selection ("survival of the fittest," i.e., producing the most offspring).

The remainder of the book is largely devoted to the argument that proof of any one of these propositions is lacking. One is alerted to how the argument will be slanted when Johnson says that clearing up the confusion of what is meant by "creation-science" and "creationism" is "one of the purposes of this book." In a footnote he defines how these terms will be used: "'Creation science' refers to young-earth, six-day special creation," whereas "'creationism' means belief in creation in a more general sense," acknowledging the findings that "the earth is billions of years old, and that simple forms of life evolved gradually to become more complex forms" (p. 4). Creationists "believe that a supernatural Creator not only initiated this process but in some meaningful sense *controls* it in the furtherance of a purpose." On the contrary, he continues, "By 'Darwinism' I mean fully naturalistic evolution, involving chance mechanisms guided by natural selection" (p. 4).

It is the chance, purposeless aspect of Darwinism that turns out to be the major bone of contention, and throughout the book, Johnson resorts to an adversarial approach. In referring to the neo-Darwinists, he frequently substitutes the epithet "scientific establishment."

Johnson disposes of natural selection by illustrations that show that it amounts to a tautology. He mentions Karl Popper's claim that "Darwinism is not really a scientific theory because natural selection is an all-purpose explanation which can account for anything and which therefore explains nothing" (p. 21). Pointing to the circularity of Darwinism, Johnson states, "Nature must have provided whatever evolution had to have because otherwise evolution wouldn't have happened" (p. 43).

In places, the adversarial approach becomes frankly *ad hominem,* as for example, when Johnson singles out certain authorities, saying, "[Name] supposes what he has to suppose, and [Name] finds it easy to believe what he wants to believe, but supposing and believing are not enough to make a scientific explanation" (p. 42). "The prevailing assumption in evolutionary science seems to be that speculative possibilities, without experimental confirmation, are all that is really necessary" (p. 43).

Darwin, he notes, laid great emphasis on gradual changes over a prolonged period of time as a basic underpinning of his theory and was troubled that the fossil record did not provide more examples of such gradualism. Yet he could offer several explanations for imperfections in the fossil record. After his own analysis of the fossil record, Johnson concludes that "the fossils provide much more discouragement than support for Darwinism when they are examined objectively, but objective examination has rarely been the object of Darwinist paleontology" (p. 84). The approach, he says, has consistently been to find some supporting link and offer it as proof of evolution. "We hear nothing of the difficulties because to Darwinists unsolvable problems are not important" (p. 85). What the fossil record actually shows are long periods of stasis of species, punctuated by the sudden appearance of new species (so-called saltationism, or "punctuated equilibrium").

Arguments regarding common ancestors are dealt with in much the same

vein. He dismisses one of the most persuasive examples of evolution—the transitional forms between the mammal-like reptiles (therapsids) and mammals—because Darwinian theory demands tracing one particular form back to a single line of ancestral descent. Here, however, one must interject that paleontologists with a scrupulous eye for detail point out that fossils of the most advanced therapsids resemble so closely those of the earliest mammals that the most reliable distinction is the presence in the therapsid jaw joint of two small bones that become the malleus and incus of the mammalian middle ear. Moreover, in a remarkable recapitulation of phylogeny in ontogeny, this very migration of the auditory components can be observed in the developing human embryo.

Johnson later comes to the point of his early stated purpose of clarifying the confusion between creation-science and creationism (p. 110). Having pointed out what he regarded as major weaknesses of neo-Darwinist explanations, he appears to lose his patience, and he asks, "Why not consider the possibility that life is what it so evidently seems to be, the product of a creative intelligence? Science would not come to an end" (p. 110). And a few pages later the question surfaces again: "Is mainstream science opposed to the possibility that the natural world was designed by a Creator for a *purpose?* If so, on what basis?" (p. 113).

All in all, Johnson claims, Darwinists are always looking for *positive* signs of evolution and are assured of theoretical correctness on the basis of a few examples. What he suggests instead is to follow Popper's recommendation: to start with an imaginative hypothesis and then to look for all the possible ways that it can be falsified. Common ancestry, Johnson says, is just a hypothesis, "which, in Popper's terms, means that we should test it rigorously" (p. 153). The author comments in several places on the need for "empirical testing" but offers no suggestions as to how to go about it. The apparent vacuum in this respect is not surprising. To quote Michael Denton (the author of *Evolution: A Theory in Crisis,* which deals with the same Darwinian propositions): "By its very nature, evolution cannot be substantiated in the way that is usual in science by experiment and direct observation" (p. 55).

Although using different arguments, Johnson and Denton would both agree that it is the inability to explain discontinuity in the fossil record that presents the major fault in Darwinian theory. But in regard to saltatory evolution, it is interesting to refer to current speculation that mutations in as few as five genes may have resulted in the total lack of similarity between present-day cultivated corn and its putative ancestor, teosinte. And as to the possibility of apparent rather than actual stasis, one can point to recognized behavioral, chromosomal, and other differences of closely resembling species that would leave no trace in the fossil record.

In bringing up the matter of purpose in connection with creationism, Johnson, like many other writers on this subject, fails to consider two of the most difficult of evolutionary questions. One question pertains to giving an explanation of *directional evolution,* as wonderfully illustrated by the therapsids and mammals. As Broom commented on the first page of his classic book *The Mammal-Like Reptiles of South Africa and the Origin of Mammals* (London: Withyerby, 1932), the study of the Karroo beds "is like examining the pages of a book of history." Here one finds in the fossil record several lines of therapsids, all developing changes toward the mammalian

condition, including changes indicative of an approach toward endothermy. The paleontologist Everett Olson points out the difficulty of reconciling directional evolution with current genetic-selective concepts of evolution. "Are we dealing with two kinds of systems," he asks, "one for now and one for the future?" (1959, *Evolution, 13,* p. 149). And in regard to mammals, one might say there could hardly be a more persuasive demonstration of directional evolution than what is revealed by the comparative study of mammalian brains from many different species, which nonetheless all show the presence of similar structures in varying degrees of development.

A question particularly relevant to purpose is the following: Given all the animal and human suffering that has accompanied the evolution of life on this planet, what can be the purpose of perpetuating life either in this world or elsewhere in the universe? In light of fractal biology and the interplanetary availability of the organic ingredients of life, one almost gets the impression that, given the right conditions, life-forms would "crystallize out" and ramify somewhat like the crystallization of inorganic matter. Mention was just made of directional evolution in mammals. In regard to the posed question about suffering, perhaps it is cause for some optimism that because of a directional turn in the development of the human frontal lobes, we find ourselves witnessing for the first time in the known history of biology the appearance of beings concerned not only with the welfare and future of their own kind, but also with the suffering and dying of all living things.

One last comment will concern the potential drawback of the use of an adversarial style in discussing scientific and other intellectual matters. The history of astronomy is enough to illustrate that there may be a stasis in the evolution of ideas just as there is an apparent stasis in the evolution of a species. A problem with the adversarial approach is that by arousing the ire of contenders, it may work somewhat like a catalytic hardener of plastic material, making people more set in their thinking. To paraphrase an old saying, outworn theories doomed to extinction seldom die before their authors. Consider, on the contrary, the creative influence of humor and play, as illustrated by Koestler's use of the joke as a paradigm of the creative process (*Act of Creation,* 1964). Play is one of the three cardinal forms of behavior that characterize the evolutionary transition from reptiles to mammals. Indeed, play can be said to be a typically mammalian trait. The positive influences of play are best seen in the anthropoid apes and in human beings (see Margaret D. Power's essay "The Cohesive Foragers: Human and Chimpanzee," in *Social Fabrics of the Mind,* ed. Michael Chance [Hillsdale, N.J.: Erlbaum, 1988]). The anthropoid signal of the invitation to play is far more effective than the simian angry threat in inducing cooperative behavior. Since we can never learn more about ourselves and our environment than is provided by the brain's algorithms, it is important to create an intellectual atmosphere that is conducive to our listening to the *silent play* of the brain's algorithms. In this manner, we become somewhat like those mathematicians who can hear the melody of their equations.

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*Meeting God through Science: Hidden Realism.* By MICHAEL MUTSUO YANASE. English translation by William Johnston. Japanese text by Masuru Kawada. Tokyo: S.J. House (7-1, Kioicho, Chiyoda-ku, Tokyo), 1991. English text xv + 114 pages, Japanese text xiv + 88 pages. ¥1500.

This book comes as a surprise from Japan. The ideas it presents are so novel that they would be difficult to summarize for a critical review. Therefore, a critical approach will not be taken; rather, this "review" represents an essay to render the principal ideas laid out in this book. It starts with an autobiography—an essential key to the main part, which is written in rather objective language.

The author is a Japanese Jesuit with family roots in the samurai. He grew up within a middle-class family who observed Western values and customs, while also keeping up the samurai tradition; thus he received "a heritage of both eastern and western culture" (p. 3). His grandfather was a fervent Protestant; his mother, originally a Buddhist, became an Anglican during her student days. The family at first attended the Protestant church of the father but some time after his death became Roman Catholic, perhaps because Michael Yanase's sisters attended a Catholic school. Although they still had many Protestant relatives of high standing, they did not experience "strife between Christians of various denominations, [and] already from childhood" Yanase "was raised in an ecumenical atmosphere" (pp. 3-4).

He attended "a particularly good school" (p. 6), where he received a Western education in science, literature, and Eastern classics. He also had supplementary private lessons in the classical Chinese/Japanese tradition of reading, without further explanation, Confucius, Mencius, and other famous writers. In the same way, he was introduced to the tea ceremony and *kendo* (the art of fencing). In high school, in spite of his inclination to literature, he took up "mathematics, physics and chemistry with their lucid logic and their truth built upon clear-cut experimentation" (p. 7).

At the university, he once more chose physics, although he was strongly attracted by philosophical and theological questions. Although he had to go through a crisis in faith, he was helped to overcome it by a good teacher and especially through a personal religious experience linked to the word of Christ: "I am the living bread which came down from heaven" ([John 6: 51], p. 8). His thought was also shaped by work in experimental physics, which he did along with theoretical work. He realized "that we must be completely obedient to the experimental results rather than to any abstract calculation" (p. 9).

After Yanase finished his studies, he spent two years as a research assistant at Tokyo University. But after Hiroshima, he abandoned physics to become a Jesuit, embarking on ten years of study. He learned Latin and Greek and went to Germany to study theology with Karl Rahner.

During this period he began to question the unity of Western thinking, including theology. For him, a Japanese and an Oriental, this problem concretized around the "Japanese word *michi* which means *way*" (p. 11), an important notion used in many contexts—for example, "the way of tea,"

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"the way of the warrior," "the way of poetry," "the way of flower arrangements." He discussed the problem with Rahner, quoting Christ's assertion "I am the way" and noting the lack of any elaborate theology of "the way." Rahner replied, "This is the theology that you Orientals must create" (p. 11).

After completing his theological studies, Yanase spent two years in Princeton as a visiting fellow at the Institute for Advanced Studies, studying the "problem of measurement of quantum mechanics" under J. Robert Oppenheimer and Eugene P. Wigner (p. 15). But his "main interest was not in a specialized department of physics"; rather, his mind was occupied with the "philosophical problem of cognition, the relationship between subjectivity and objectivity," and problems of regression. Beyond this, his interest went deeply into "the problem of the basis of the theory of physics," and he chose to make "the foundation of science . . . his principal subject of study" (p. 15).

This wide scope of basic research, fed from both a solid knowledge of physics and a complete training in philosophy and theology, was not a problem among others to be considered during the lifetime of a scholar. It has been "the problem that has been at the basis of" his "whole life and" his "very existence" (p. 16). The book is thus not a purely formalistic exposition of a kind of coherent system but the description of an existentially experienced reality. It cannot be more "than a starting point with the hope that people who read" his "words and find interest in them will develop their own thoughts and ideas in their own way and in their own field of study" (p. 16).

An introduction following the autobiography provides a short sketch of current trends in science, philosophy, and theology. It traces the rise of the belief that everything can be explained by physics and mathematics, and the growing reluctance "to accept any type of reductionism, that is, the interpretation of social and vital phenomena by an exclusively mathematical or physical methodology" (p. 26). In theology, especially Catholic theology, the long-established reliance on "*natural recognition of truth* as the methodological approach" is no longer taken for granted. "The Second Vatican Ecumenical Council acted as a shock to the stability of theological methodology itself and engaged in an ongoing heated debate" (p. 29). Problems that arise in one specific field of science cannot be solved within that specific field itself. The natural sciences are confronted with the problem "of the applicability of traditional physical methods," a problem that appears not only in physics. Yanase points to the problems of "(*a*) the analytical method as a methodology; (*b*) the interaction between object and subject in quantum mechanics and the theory of relativity; (*c*) the way of handling the subject physically" (p. 31)—problems which are even more pronounced in biology and sociology. Even in theology, the "problem of time and space is obviously considered as an element of methodological debate" (p. 33). And since theological methodology "is the fruit of Western culture, it seems [to Yanase] that it faces the same problems that the methodology of natural sciences confronts."

The fundamental need "to unify all the sciences in a synthesis" means "that we are in search of a kind of harmony based on some *fundamentals* of humanity." The emphasized word seems to be the key to understanding what Yanase wants to reach: He is not so much concerned with a perfectly

working formalistic logic as with "a knowledge that is not only Western in culture, but is a common asset of the entire human race." This is, according to Yanase, the "kernel of the problems confronting all fields of science today" (p. 33).

In trying to solve the problems raised, the author does not attempt to present a thorough analysis but seeks for common elements: He tries to touch "what is fundamental in the deep furrows of human existence" (p. 34). In doing this he describes an attitude, "not a particular system of philosophy." He names this attitude *hidden realism,* "an attitude which is the fundamental element hiding at the bottom of natural science, philosophy and theology." Yanase insists that hidden realism is not, like realism, a philosophical system; rather, it points "to an attitude that people adopt without realizing it, even when they uphold other theories such as positivism or idealism" (p. 34).

After a short historical survey of realism, Yanase offers a critical review of realism as a philosophical system. In its most elaborated form, as the Scholasticism of Thomas Aquinas, realism is no longer considered seriously, even within the Catholic church, because the basis of the system, the self-evidence of eternal truth, has been rejected. As a result, infinite retrogression or an appeal to common sense becomes inevitable. And though common sense seems to be sound, it "cannot be an ultimate basis of philosophical thinking per se" (p. 46).

One of the major problems with Scholasticism, for Yanase, lies in the fact that it "fails to include in it the Oriental attitude or the Oriental mode of thinking" (p. 46). The latter has growing influence in our day, and Yanase suspects that Teilhard de Chardin did not escape this influence when writing *The Phenomenon of Man.* The critique of Scholasticism applies as well to most modern Western philosophical systems. "Strictly regulated concepts and reasoning based on formalistic logic have been the common characteristic of philosophy even in modern times" (p. 48), and this goes as well for the physical sciences.

Hidden realism is opposed to these systems. It "is not based on the sciences, nor is it based on philosophy or the philosophy of science. Rather, it is a standpoint that is found on a deeper level" (p. 48). As does philosophical realism, hidden realism "recognizes the existence of object things together with the existence of the subject" (p. 52). The important difference between the two "lies in the fact that [hidden realism] does not rely only on the formalistic logic of Scholastic philosophy. And the explanation of the ultimate basis of truth is not only hidden, but does not condemn other systems of philosophies as mistaken. . . . [I]t supports the various philosophical systems which cannot be dealt with by formalistic logic, such as the philosophical systems of Oriental Philosophy" (p. 52).

The characteristics of hidden realism as a philosophy are quite unconventional. "The standpoint of hidden realism is based on the fundamental basis of human existence. It is an attitude that is fundamental not only to the sciences, but to other philosophical systems as well. Moreover, the intellectual activities of a person who adopts this attitude [are] free from traditional formalistic logic" (p. 53). This rather shocking description of hidden realism draws its justification from the incapacity of formalistic logic to describe "ultimate fundamental existence" (p. 53). Another kind of logic that is not bound to a dichotomic procedure has made its appearance as

"fuzzy logic," developed by mathematicians as a generalization of symbolic logic. It can handle probabilistic statements—for example, that something is *probably* true or *probably* false. This fuzzy logic allows one to manipulate concepts that are neither true nor false, as we do in everyday life, where "our way of defining a concept is in most cases fuzzy and vague" (p. 55).

Yanase holds that this very fuzziness of concepts enables us to communicate. It will help us to avoid an infinite regression and "deter us from being too strict in applying formal logic to human situations. Further, it is by using this loose logic that ultimate truth will be guaranteed to us" (p. 57). This approach concerns as well the notion of God: "The very fact that there is a conceptually vague existence—an absolute existence, which in the traditional Western concept is known as God—will fully satisfy us. Whatever concepts serve as the basis of the various philosophical system to which we hold, it is this very attitude of nonconceptual assent to existence that will make it possible for us to reach agreement" (p. 57). Thus this is a logic "closer to our human existence" (p. 57). Truth is not logically guaranteed: "we must rely on the ultimate and most fundamental actual experience of each individual" (p. 58).

Since hidden realism is founded on the individual experience of existence, it cannot be based on a clear and distinct concept. Our own experiences more or less compel us to recognize within our own existence "the absolute and ultimate basis of our existence" (p. 59). The difficulty with this existential approach is that it does not allow for a logical proof; it can only be experienced individually, and Yanase invites the reader to take this stance. "Once we adopt this vague way of defining concepts, it will be possible for each to define the words as he speaks. The fact that this way of doing things makes communication possible can only be confirmed through individual action" (p. 60). In this way, "intersubjectivity" can be attained (p. 61).

This attitude is hidden because we are not explicitly conscious of it. In Western philosophical debates, "we clearly define our concepts and engage in debates using formalistic logic." Not so in the Oriental world. "Oriental thinking does not necessarily require clear-cut definitions of concepts. Most often, the results of meditation are transmitted as such in poetic expressions" (p. 61). In Oriental thinking, fuzzy logic plays an important role: "looseness in logic and fuzziness in defining concepts is one of the characteristics of the Oriental way of thinking" (p. 62). The "attitude of satisfaction with fuzzy logic or ambiguity is very effective in theological arguments, especially in moral arguments" (p. 63). Yanase points out that especially in Catholic theology, "the insistence on clear and distinct definitions of concepts has had harmful consequences" (p. 63). Spirituality is endangered by too-clear definitions. And it is only natural "that the definition of God through a concept would result in the vaguest concept of all" (p. 64).

Yanase maintains that all philosophical systems are supported by hidden realism. Even for those who cannot communicate on the basis of a particular philosophical system, "there still will exist a kind of communion based on their common existence" (p. 66).

This kind of hidden realism seems to be rather demanding. But it still can be followed with some creative imagination. To understand the second part of the book, however, one needs at least some insight into modern physics. Yanase takes his starting point from the changes brought about

by Einstein's general theory of relativity and the space-time continuum, on the one hand, and the introduction of quantum electrodynamics on the other. As is well known, the two theories have so far not been brought into a fully satisfying integration. One of the important questions is "whether it is possible to convert time into space and observe it from the outside," a question that is essentially equivalent to asking if it can be observed from the perspective of eternity. This question can only be answered in the negative. But here a serious problem arises: "To convert time into space and observe it from the outside is not only indispensable for the theory of relativity, but it is necessary when we question the consistency of quantum mechanics as a system, especially in problems concerning measurements" (p. 77). The observer needs to be outside four-dimensional space-time but cannot look at reality from the perspective of eternity. In philosophy this problem arose very early: Plato's *Timaeus* examined the question of whether the universe was created *in tempore* (in time) or *cum tempore* (together with time).

Yanase points out that philosophers in the Middle Ages had to address the question, In what kind of time can the spiritual existence of angels be thought of? Out of this reflection grew the notion of "*aevity* as midway between time and eternity" (p. 79). This concept was widely debated by the theologians of the thirteenth century.

Yanase still finds it useful: "If we free ourselves from the hold of one-dimensional time with its before and after, we will inevitably find ourselves in need of a field that is between eternity and time. This field is aevity" (p. 81). In fact, he believes that "aevity seems ideally capable of satisfying our desire to maintain consistency within the framework of modern physics" (p. 82). This seems possible to Yanase because, "granted that human beings are finite physical entities and are bound by time, they are in their thoughts transcending time and it is quite appropriate for them to consider aevity as their field of activities" (p. 82).

Aevity is a field "which enables us to observe three-dimensional space from the outside. This is so because it applies not only to the theory of relativity and quantum mechanics, but also to the "ordinary spiritual activities" of humans (p. 83). Yanase names this generalized concept of space-time *ionity,* which can be considered "as the field of our spiritual activities" (p. 84). The human spirit, with aevity as a "hidden field of human existence" (p. 84), is not only "a physical and sensory existence, but is also ional existence. Metaphorically, the human spirit can move freely higher than four-dimensional space-time" (p. 84). Thus, "man in his core depth is related to eternity through ionity" (p. 85). In daily life, Yanase believes, hidden realism and aevity should "be the basis of our unified selves" (p. 86) and lead us to recognize, though vaguely, the absolute reality that is "named God in a Christian context" (p. 87).

In the last section of his book, Yanase indicates a number of fields in which his hidden realism combined with fuzzy logic and ionity might be fruitful. In relativity and quantum mechanics, the problem of the observer could find a new answer, and the questions of measurements could find another solution. Mathematics could appear in a new perspective. In biology, the use of hidden realism might have a special impact because of its not-so-formalistic logic. And sociology as well as psychology could only win if they were free from the self-imposed constraints of misconceived logical formalisms. Philosophy might get quite a boost by accepting hidden

realism as a way to overcome the systematic limitations that cut out the possibility of communication. The question of how hidden realism might be present in literature and art is worth exploring. Theology will need reordering; especially in the field of mysticism, hidden realism, with its ionity and fuzzy logic, could be extremely helpful. Thus, Yanase claims—and rightly so, if his hidden realism is sound—that this philosophical tool will influence and change the entire field of activity of the human mind. His ideas are certainly a challenge to Western thinking, but they merit careful examination. To consider them requires at least the hypothetical and partial abandonment of one's own Western way of thinking.

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*God and the Cosmologists.* By STANLEY L. JAKI. Edinburgh: Scottish Academic Press, 1989. 286 pages. £9.50; Washington, D.C.: Regnery Gateway, 1990. $10.95 (paper).

The continuing popularity of books on cosmology shows an awareness of its fundamental importance. All ancient civilizations had their cosmologies—their ideas about the relation of humans to their surroundings—considered in the most general sense. In fact, all great philosophical systems were cosmologies, from those of Plato, Aristotle, and Plotinus, the atomists and the Stoics, through those of Origen, Augustine, and Aquinas to the cosmologies of Descartes, Leibniz, Hume, and Kant.

In all cosmologies, fundamental theological ideas are expressed using the philosophy and science of the times, and this is why cosmology has a perennial attraction. It enables us to see our place in the great scheme of things, spread out through the vastness of space and time, and can offer answers to the basic questions about how we came here and what it is all for.

It is thus very natural that scientists have tried, with varying degrees of success, to explain what we know about the universe, and to give their answers to questions about the origin of the world, its evolution, and its eventual end. All too frequently those scientists, however brilliantly they have summarized current scientific understanding, have fallen woefully short when they have come to philosophical and theological matters, which require at least as great expertise.

It is therefore a pleasure to find a book on cosmology by one who is professionally trained both as a theologian and as a physicist, and as well, has an encyclopedic knowledge of philosophy and history. In eight chapters, originally given as lectures in Oxford, Jaki reviews the development of our knowledge of the universe through history, the importance of time, the limits to our understanding, the impact of quantum physics, chance and purpose, and finally, the implications for theology of our ideas of the universe.

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Not all cosmologies, says Jaki, had a conception of the universe; indeed Kant declared such thought to be the product of the illegitimate cravings of the intellect. In the subjectivism that followed, the universe had no place. It was the scientific achievements of the present century, particularly Einstein's general theory of relativity, that gave for the first time fairly contradiction-free accounts of the universe as the totality of consistently interacting things. Subsequent work has shown the extreme specificity of the universe; if the initial conditions had differed by an exceedingly small amount, no carbon could have formed, and so there would have been no possibility of life. Such extreme specificity calls for an explanation that can only come from beyond science and thus provides a compelling basis for the cosmological argument for the existence of God.

Jaki mentions several ways of avoiding this line of thought. One is by appealing to an eternal universe, for if it has always existed, there is no reason to ask why it began. The idea that the history of the universe consists of an infinite series of cycles within which all events are repeated again and again is found in many ancient civilizations. It proved intensely debilitating and was one of the main factors preventing the rise of modern science. It was the Christian belief in the unique incarnation of Christ that finally destroyed these treadmills. Thenceforth time was linear, not circular, with a beginning and an end.

Another argument is that the universe is necessary and therefore requires no explanation. Jaki believes this is refuted by Gödel's theorem, which shows that no nontrivial set of arithmetic propositions can contain the proof of its own consistency. Since any theory of the universe is mathematical, Gödel's theorem must apply to it, and so we can never be sure of the necessary truth of any cosmological theory.

The scientists' grip on the reality of matter, and hence on the reality of the whole universe, was threatened by the Copenhagen interpretation of quantum mechanics. The Heisenberg uncertainty principle can be written in terms of energy and time, and when it is applied to virtual particles, it means that the shorter the lifetime, the greater the mass. If the mass is almost zero, the lifetime can be almost infinite. Now notice that the total mass of the universe is almost exactly canceled by the gravitational energy of all its attractive forces, and we see that the universe, if a virtual particle, can exist almost indefinitely. Thus the universe, it is suggested, "pulls itself out of nothing as if by a cosmic bootstrap" (p. 130).

No one with a grasp of ontological reality, Jaki continues, could accept this for an instant. Nothing can come from nothing, and the difference between existing and not existing is the greatest possible difference. Furthermore, the usual interpretation of the uncertainty principle is itself based on the obvious fallacy that what cannot be measured exactly cannot take place exactly.

Further confusion is associated with interpretation of modern theories of chaotic systems. It has been shown that their behavior is exceedingly sensitive to the initial conditions, so that it is quite impossible, even with the fastest computers, to predict their future behavior for more than a very short time ahead. Nevertheless, this is not incompatible with their being completely determined by the initial conditions. Inability to predict the future behavior of a system exactly does not demonstrate that the process does not take place exactly.

The application of the results of nuclear and particle physics has now enabled us to understand in some detail the processes occurring in the first few instants after the Big Bang. They are exceedingly specific; if the constants of nature or the initial conditions had been even very slightly different, there would have been no possibility of our being here at all. This extraordinary specificity has led to speculations associated with the anthropic principle.

What is less often discussed is the extreme specificity of the later stages in the evolutionary process. The evolution of life on earth required our planet to be at a definite distance from the sun, with a moon massive enough to cause the tides. The development of science was greatly helped, if not made possible, by the pole star, Sirius and its attendant white dwarf, and the Crab nebula. Similar unlikely events abound in the history of science, from the chance observation by Oersted of the motion of his compass needle to Roentgen's leaving a key on his unexposed photographic plates.

In his final chapter, Jaki shows the connection between theological beliefs and concepts of the universe, with particular reference to the cosmological argument. The extreme specificity of the universe and the extraordinary series of unlikely events that have led to the emergence of life, of humankind, and of science all provide compelling evidence for a Creator responsible for the whole process.

These brief paragraphs can give only a hint of the richness of this book, and of the immense learning deployed by Professor Jaki. It is an endless source of information on modern cosmology and its relation to theology, infused with an acute philosophical sensitivity that can see treacherous ideas lurking behind so many of the seemingly innocent phrases of modern cosmological writers. Every sentence is so loaded with meaning that it is hardly possible to absorb it at the first or even the second read. Jaki tends to assume in his readers a breadth of knowledge similar to his own. It is thus to be hoped that one day he will produce a systematic treatise setting out his own beliefs in logical order, with full references to their justification and historical development.

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