

## Reviews

*The Theologian and His Universe: Theology and Cosmology from the Middle Ages to the Present.* By N. MAX WILDIERS. New York: Seabury Press, 1982. 289 pages. \$21.95.

It is most thought provoking and helpful to trace in detail the history of the relationship between western cosmology and theology. Max Wildiers's succinct and lucidly written survey is just the kind of book to introduce a reader to this very important and generally far too little known area of the western history of ideas. Particular aspects or personalities involved in the relationship between cosmology and theology have been examined in great detail before, and the present work with its ample references draws on much of this earlier research, but I do not know of any work which summarizes so much material in such a brief and clear form.

The study is organized in three parts. The first deals with "The Cosmological Background to Medieval Theology." It shows that the sources of the medieval world view were supplied by the philosophical speculations of the ancient Greeks on one hand and the scriptural statements of the Bible on the other. From the patristic era onwards, that is, the time of the early Church Fathers, these two sources were harmonized by Christian thinkers and eventually built into a grand synthesis by medieval theologians, especially by Saint Bonaventure and Saint Thomas of Aquinas. Here was a picture of great coherence, harmony, and beauty—a view of cosmos and creation seen as a hierarchical order which befitted the Christian view of salvation. Wildiers's strength lies in emphasizing the common rather than divergent elements in the world view of medieval theologians, a view which "resulted in a harmonious unity of cosmology, anthropology, and theology that is unique in the entire history of Western thought" (p. 76). In view of the quite different situation in Christian theology today it is also important to realize that the task of developing a Christian cosmology was seen to be just as necessary during the Middle Ages as that of providing a Christian anthropology. According to Wildiers, a Christian interpretation of the cosmos is intrinsic and not merely incidental to the medieval world of thought.

The second part of the book deals with the "Decline of the Medieval World Picture," describing the well-known developments from Copernicus to Charles Darwin which led to a profound crisis in religious thought. A fresh, open approach to the new ideas would have offered several possibilities for theological thought which are briefly considered here; but the concept of order and that of hierarchy remained predominant, thereby stifling new, creative thinking in theology. This is amply demonstrated by the condemnation of Galileo whose case is examined in considerable detail, and the theological aspects of this traumatic confrontation are well brought out.

Wildiers concludes his survey from the first half of the seventeenth until the middle of the twentieth century by saying "that the interpretation of Christian

[*Zygon*, vol. 19, no. 2 (June 1984).]

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doctrine, both from the most authoritative theologians and in theological instruction in general, remained fundamentally the same as that of the thirteenth century. The only difference is that the world picture that was central to the medieval world of thought gradually disappeared. For the rest there were few changes. The result was, of course, an antiquated theology that became more and more estranged from the world" (p. 159f.).

"The Contemporary World Picture and Theology," presented as the third and final part of the book, is very stimulating but perhaps least satisfactory, for so much had of necessity to be left out. It begins with a fine essay on the concept of the world in the natural sciences (the boundless, dynamic, and organic universe as understood today) and the "life-world" dealt with in existential phenomenology, and it tries to relate these two different worlds. This is followed by a chapter on the "World Picture and Theology in the Work of Teilhard de Chardin," on which Wildiers, as editor of Teilhard's philosophical and religious writings, is an internationally renowned expert who has written on this subject at greater length elsewhere. The book then concludes with a chapter on "The New Confrontation between World Picture and Theology" where other important thinkers are examined and the fundamental question whether we possess an interpretation of Christianity today which is in harmony with our contemporary cultural situation is raised. Various paradigm shifts have happened in recent theologies, and various attempts are cited to rethink Christianity within the framework of our present experience of reality. But these attempts are far from complete and not altogether satisfactory.

If I understand Wildiers rightly, he regrets that the emphasis on understanding human reality at the personal and social level and on developing an adequate theological anthropology is not matched by similar efforts to develop a satisfactory contemporary Christian cosmology. This task seems to have become marginalized, or perhaps it is too difficult. The medieval world view, based on Greco-Roman elements and biblical data, led to a cosmology which proved to be mistaken. Recognizing this mistake today we must not neglect what Wildiers calls "the invisible bond between cosmology and theology" (p. 235) while being aware that contemporary theology "can be said to be confronted with three important authorities: the natural sciences, the human sciences and social theory, not to mention history and the hermeneutics of biblical texts and documents of the past" (p. 235). The reader is left to muse how small or vast the universe of contemporary theologians may be—or whether theologians have any room for cosmology in the modern sense at all.

The conclusions of the book may be considered as too brief and its greatest lacuna is perhaps the lack of attention given to the global context in which discussions about cosmology and theology must take place and where other religious world views as well as those of Christian theology are important for an encounter and dialogue between science and religion. If recent discoveries in cosmology represent one of the great intellectual adventures of our time, certain parallels between cosmological and religious insights, especially as found in some religions of the East, are equally exciting for the encounter between cosmology and theology in a wider sense, but this is a topic not touched upon in this book.

Another regrettable feature of this study is the omission of recent works which have appeared since 1977 when the current book first appeared in its original Dutch version. It has since then been translated into German and Polish but has only now appeared in English. Its references are perhaps more to French and German studies than to works in English. It is certainly to be

regretted that recent books on Teilhard de Chardin (such as for example J. A. Lyons's basic study *The Cosmic Christ in Origen and Teilhard de Chardin* [Oxford: Oxford Univ. Press, 1982]) and other thinkers could not be taken into account in this translation nor the very recent, stimulating number on "Theology and Cosmology" of the journal *Concilium* (June 1983). The fact that we have here a translation from the Dutch also accounts for certain infelicitous expressions, such as *world picture* (given as translation of Heidegger's *Weltbild* on p. 165 but used throughout the book) rather than the more customary English *world view*, and an occasional reticence in style. It might be argued that *world picture* is a more appropriate term within the context of the book and has been used deliberately by the translator, but, if this is so, the term would at least have required some discussion. There are also a number of regrettable printing errors which need not all be listed; the worst is *principle* rather than *principal* (see p. 143, p. 180) and *Norbert Weiner* instead of *Wiener* (p. 179).

These shortcomings notwithstanding Wildiers's work can be thoroughly recommended as an initial introduction or survey for those little familiar with the relationship between theology and cosmology. It will be particularly helpful for students undertaking a survey course on science and theology or a similar theme. The valuable bibliographical references encourage further study in greater depth, and the book should certainly be found in all college and university libraries. Had a historian or philosopher of science undertaken this survey, it would no doubt have been different. However, the special value of this work lies in the fact that a theologian and philosopher has traced in great detail and with much expertise the theological subtleties affecting the understanding of cosmology in the history of Christian theology. Wildiers's meticulous scholarship and great clarity in presenting very difficult issues will be of immeasurable benefit to theologians and historians of science alike.

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*On Knowing God*. By JERRY H. GILL. Philadelphia: Westminster Press, 1981. 173 pages. \$9.95 (paper).

"Critical philosophy," according to Jerry Gill, is the philosophical position which has come to dominate Western thought since the seventeenth century. Its early developers included René Descartes, David Hume, and Immanuel Kant. In the twentieth century Bertrand Russell, the young Ludwig Wittgenstein, and A. J. Ayer have been among its leading architects. In *On Knowing God* Gill argues that this prevailing philosophical position is inadequate as a resource for the interpretation of contemporary life and especially as a framework within which to understand religious phenomena. In addition, he argues that there has emerged in this century a more adequate alternative philosophical position which he identifies as "post-critical."

The book is divided into three parts. The first is an appraisal of critical philosophy in terms of its interpretations of experience, meaning in language, and knowledge. This part concludes with a consideration of the consequences

[*Zygon*, vol. 19, no. 2 (June 1984).]

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of these interpretations for the philosophy of religion. The second part is a sketch of the post-critical position as it can be drawn from the phenomenology of Maurice Merleau-Ponty, from the later works of Wittgenstein, and from the explicitly post critical epistemology of Michael Polanyi. The concluding part of the book uses post-critical philosophy as a resource for a contemporary interpretation of religious phenomena: religious experience, religious language, and religious knowledge. As can be seen the overall tripartite structure of the book contains within it a recurring three-part reflection on experience, language, and knowledge.

Gill associates critical philosophy with the following affirmations: that experience is to be identified as a passive mental process by which static, mutually independent objects in the world are impressed upon the mind; that meaning in language is to be determined analytically by measuring the precision with which words are able to point to the objects of experience; and that knowledge amounts to the fully articulate conceptualization of those objects by inferential processes, either inductive or deductive, whose steps can be completely specified. Gill finds these positions argued forcefully in such works as Russell's *Logic and Knowledge* (London: Allen & Unwin, 1956), Wittgenstein's *Tractatus Logico-Philosophicus* (London: Routledge & Kegan Paul, 1961), and Ayer's *Language, Truth and Logic* (London: Oxford Univ. Press, 1936).

One result of these affirmations is reductionistic naturalism. Such a naturalism denies the authenticity of religious experience of the transcendent. Further, since religious language refers to the transcendent, and since the transcendent is an illusory referent, then religious language is cognitively meaningless. Finally, since the object of religious language, the transcendent, cannot be fully conceptualized nor the path to religious knowledge fully specified, claims to religious knowledge are invalid.

The problem with the critical perspective is that its own claims cannot be validated in terms of its own standards. Also, atomic objects of experience have yet to be identified. Further, language is contextual and thus relational in its origin and use; therefore, meaning cannot be determined by a process of pointing. Finally, ordinary experience demonstrates that there are many things which we may be said to know but which we are not able to articulate exhaustively; nor are we able to specify completely the means by which we acquired such knowledge.

Moving beyond these criticisms, Gill offers an alternative to the critical position which he designates as post-critical. Such a philosophical position affirms the following. First, it is held that experience is intentional, embodied engagement within the relational fabric of the world. This point Gill finds effectively argued by Merleau-Ponty in *The Phenomenology of Perception* (trans. Colin Smith, New York: Humanities Press, 1962). Second, a post-critical philosophy holds that meaning in language is determined contextually in relation to the social functions which language serves. On this point Gill's primary source is Wittgenstein's later work, especially *Philosophical Investigations* (New York: Macmillan, 1953). Finally, it is held that all explicit, focal, and articulate knowledge is grounded in a logically prior tacit, mediated, and bodily knowledge. This affirmation Gill finds not only in the writings of Merleau-Ponty and the later Wittgenstein but most particularly in Polanyi's *Personal Knowledge* (Chicago: Univ. of Chicago Press, 1958).

A post-critical philosophy, Gill argues, provides a framework within which the religious is credible. The notion of transcendence is transformed from one

implying ontological separation to one indicating a particular form of relation—the relation of wholes to their parts. Post-critical philosophy affirms the synergistic principle that the whole is greater than the sum of its parts. This “greater than” is the mark of transcendence. Religious language, like all language, does not so much point to things directly as it mediates meaning in context indirectly. Thus, metaphor can be seen as a paradigmatic form of religious language which, though not ostensive, bears cognitive significance. Finally, religious knowledge is not to be identified primarily with explicit theological propositions but rather with a tacit knowing of God that is mediated in and through all of the various dimensions of life.

Although the foregoing is an all too brief summary of Gill’s argument, in concluding I would like to register several points of concern. First, I find the rhetorical style of the book strained and awkward. This may be due to the fact that Gill offers in 173 pages a constructive philosophical critique of very broad scope. Nevertheless, the readability of the work suffers in the process.

Second, although a post-critical philosophy is open to the possibility of metaphysical development and has metaphysical presuppositions and implications, no attempt is made in the book to address metaphysical questions as such. Part of the reason may be the justified suspicion by many post-critical thinkers of the dogmatic tendency in much of metaphysics. Any such dogmatism runs counter to the developmental openness which characterizes post-critical thought. However, given the possibility of more modest metaphysical efforts, an articulated post-critical metaphysic could be valuable in raising to the level of explicit knowledge elements of the tacit dimension.

Finally, the contrast between critical and post-critical thought, which forms the backbone of Gill’s argument, could be, I believe, more effectively expressed in terms of the developmental history of the dualistic metaphysical tradition in Western thought. This dualistic position is the dominant philosophical tradition in the West with roots in both classical Greek natural philosophy and Biblical cosmology. Such diverse philosophical and theological positions as critical philosophy, existentialism, Christian fundamentalism, and protestant neo-orthodoxy can be interpreted as particular variations within this dualistic tradition which separates mind and body, history and nature, God and world. Post-critical thought with its definitive emphases on wholism and interdependence is a manifestation of a fundamental alternative to this dualistic tradition. The contrast might be expressed more effectively and historically as one between a long-standing ontological dualism and a recently emergent differentiated monism.

These criticisms, however, are relatively minor. *On Knowing God* is an important contribution to the effort to recover a credible philosophical understanding of the religious at this point in human history. It deserves to be widely read and actively discussed.

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*The Immorality of Limiting Growth.* By EDWARD WALTER. Albany: State University of New York Press, 1981. 186 pages. \$10.95 (paper).

Edward Walter, chairperson of the department of philosophy at the University of Missouri, Kansas City, has written a courageous and, in many respects, necessary book, trying to present a philosophical reflection on a current contemporary problem. In recent years, many writers such as Robert L. Heilbroner and William Ophuls have been arguing that the world's environmental problems reveal liberalism to be an outmoded and dangerous philosophy of government. Walter, an unrepentent liberal, contends not only that liberalism is not outmoded but that it is, in fact, the only political philosophy which can safely enable the world to survive its current difficulties without irreparable damages to the structures of human freedom and grave injustice to the most disadvantaged members of society. He also disagrees with most environmentalists—at least with that group he labels as “no-growth futurists”—about what the problems of the world really are. His book therefore operates on two levels, the philosophical and the factual.

On the philosophical level, Walter is quite clear concerning the foundations of liberalism. He writes, “I am both an unregenerate Hobbesian (Hobbes claimed that people are fundamentally selfish) and a skeptic who believes that political and social institutions are morally corrupt” (p. vii), and he holds out little hope that much can change. Not only are people selfish; they are irrationally selfish. Despite this, liberalism is fundamentally moral: it is the underpinning of industrial civilization which is “socially desirable,” since it has brought about “improved medication, sanitation, nutrition, and living standards” (p. viii).

On a factual level, Walter (working as he admits he must from secondary sources) denies emphatically that the world is running out of either energy or mineral resources. For example, he devotes a great deal of space to arguing that the oil crises of the 1970s were “primarily caused by political maneuvering and poor planning” (p. ix). He does agree with the no-growth futurists that there are real and grave problems of pollution and overpopulation, and that nuclear energy poses unacceptable risks, but he maintains “that liberalism is an adequate mechanism by which society can overcome the present resource-environmental crisis” (p. x).

In practical terms there is no point in disputing with Walter on the various particular points about the problems the world faces. Sometimes he appears right and sometimes naively wrong. But there are several philosophical/political questions which deserve mention. Walter is not entirely without hope as to our ability to solve our problems, because, despite believing that people are irrationally selfish and that there is “no possibility that economic, social, and political leaders can be convinced to act fairly” (p. 35), he does later admit that “people *are* capable of modified altruism and temporary rationality” (p. 83).

While Walter is cautiously optimistic about dealing with our problems through liberalism (which he also defends on the grounds that a certain material standard of life, which it makes possible, is a necessary if not a sufficient condition for freedom), those who do not share his optimism must ask themselves what their alternative is. Although his attack on no-growth futurists, whom he identifies primarily with the Club of Rome and its epigones

(pp. 2-3), may be somewhat narrowly focused, his attacks on their remedy of a steady-state economy have to be taken seriously. When he says that they "have not advanced a realistic plan for establishing a steady-state society" (p. 27), his words should recall to us the often loose and careless utopianism of many who seem to expect that recognition of the existence of ecological perils will in itself lead almost automatically to reformed political and social institutions. Liberalism, as Walter sees it, is based on a pessimistic view of human nature and its potential. Those who are more optimistic still have a great deal of hard thinking and hard work to do, and Walter's book is a valuable reminder of that fact.

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*Naked Emperors: Essays of a Taboo-Stalker.* By GARRETT HARDIN. Los Altos, Calif.: William Kaufman, 1982. 281 pages. \$17.95. \$9.95 (paper).

While this collection of essays by a distinguished human ecologist is divided into four sections entitled "Immigration," "Evolution," "Human Ecology," and "Language, the Subtle Enemy," there is one basic theme throughout: that the idea of unlimited economic and technological progress—with its corollary that through progress there is bound to be more than enough for everyone in the world—is an illusion. Furthermore, this illusion invites social and political policies that are recipes for long-run disaster for everyone.

The thesis is essentially Malthusian from the updated perspective of modern ecology. Garrett Hardin argues that, since there is not and cannot be enough to go around for all nations, those nations that are fortunate in being well off must be firm against too much sharing with those that are not well off. To pool the wealth of the world into one vast unregulated "common" is to dilute it to the point where it cannot serve anyone adequately. Is it better for all to be deprived and starve in a world of equal sharing or for only some to be deprived and starve in a world of unequal sharing? He elects the latter option as the more prudent course and as one that is in keeping with the principles that have governed biological evolution.

There will inevitably be readers who will perceive this as social Darwinism; however, they will be missing the point. Hardin does not argue for unlimited competition and survival of the fittest. Rather he argues for regulating the distribution of the world's resources so as to guarantee that they are appropriately husbanded for the benefit of those best able to use them as distinct from those who are most in need of them. Since no world government seems feasible, such regulation must be undertaken by the more advantageously situated nations in their own interest. The world, in effect, is a lifeboat with limited resources. Do we manage them so that no one survives or so that at least some survive? And how do we do the latter when there is no one in overall command of the boat?

Thus Hardin confronts us, in stark terms, with the great moral dilemma of our time. How can we be one world promoting human fellowship and at the

same time maintain a policy of unequal sharing? The underlying problem is not new in human history; nor is the moral dilemma a dilemma for everyone in the world. But the dilemma is a serious one for people who profess the Judaeo-Christian ethic and especially for the people of the United States, whose nation was founded on the perimeter of a continent in which the necessities of life were available to anyone who was willing to work for them and whose sacred creed maintains that the just society is one that provides equal opportunity for all. From this perspective, Hardin is preaching sacrilege, as he recognizes in the subtitle of his book.

Hardin offers no solution to the dilemma, other than to argue in favor of birth control, including a liberal abortion policy, and to suggest that the United States be more exclusive in its immigration policy and less generous in its international dealings. He argues especially against the kind of generosity that promotes relationships of dependency. That the propensity of the United States to promote such relationships has contributed to the problems it now faces cannot be gainsaid. But to call attention to the unhappy fact in no way helps to resolve the underlying problem: that a most sacred public value of North American society is becoming increasingly less appropriate to that society's changing circumstances. Our public value system is unable to provide a set of priorities for human expendability. The very idea is anathema; yet many societies do this, especially those that have been forced to come to terms with the Malthusian problem. In traditional Polynesia, for example, a system of social ranking based on seniority of line of descent from founding ancestors and on seniority of age among siblings provided for priorities of expendability in connection with the inheritance of land and access to resources of livelihood and also, in time of crisis, in connection with the right to survive. These priorities were understood and accepted. Given the American public ethic, however, we find ourselves unable to deal with expendability except by lottery, as with military service in war, or by free-for-all competition, as with our extensive lobbying for favors by special interest groups and our vying for monopolistic control in the marketplace. The philosophy of the unregulated, open market, developed in an era of seemingly unlimited resources, promotes the unregulated common that Hardin deplors as a policy for disaster. The fate of our society depends, among other things, on how it manages this problem, if it can find a way to manage it at all.

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*Psychology and Theology: Prospects for Integration*. By GARY R. COLLINS. Nashville, Tenn.: Abingdon, 1981. 160 pages. \$6.95 (paper).

This book, edited by H. Newton Malony, contains the ninth Finch Symposium Lectures in Psychology and Religion given by Gary R. Collins at Fuller Seminary in 1978, as well as a summary of responses to these lectures given by faculty and students. Collins's proposed goal was to explore the question, Is integration of psychology and theology possible? By the end of the book it is clear that

[*Zygon*, vol. 19, no. 2 (June 1984).]

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theology is understood narrowly as an evangelical, biblically based, Christian theology. No similar clarification is made regarding psychology.

At one point an insightful analogy is drawn that suggests Collins was aware of the scope and complexity of the project he was undertaking. He compared the problem of integration to that of the translation of one language into another. The integration of psychology and theology is not as simple as the translation of English into Chinese; rather it is more like the translation of Western language into Asian language. With this analogy Collins recognizes that psychology is not unified, for there are many psychologies. He also recognizes in principle that theology is not unified, for there are many interpretations of the Bible and many theologies.

The implication of this insight could have been profound if it was properly developed. However, Collins quickly abandons this perspective and the struggle to understand its implications by describing such theoretical work as "dull, boring and irrelevant" (p. 39). He turns instead to "demonstrate" the practical aspects of integration without establishing that such an integration is possible or, if possible, upon what grounds. I was left agreeing with one respondent's comment that much had been promised but that "no description of the tolerances or operating characteristics of these components . . . no schematic diagrams . . . no fully operational model" (p. 127) had been provided. In spite of this basic criticism that Collins's proposed goal is not met, the book contains some stimulating dialogue between Collins and his respondents that may make it worth reading for those interested in the relationship between psychology and theology. Let me review several of the issues raised.

In his first chapter, "Integration: The Approaches," Collins identifies a number of models that have attempted to integrate psychology and theology. (Compare James Lapsley, *Salvation and Health: The Interlocking Processes of Life* [Philadelphia: Westminster Press, 1972], ch. 3.) One approach compared them to two railroad tracks, equal, going in the same direction, concerned about common matters (guilt, conscience, personality, etc.), yet never meeting except in the eye of the beholder. Another approach saw them as hierarchically related, reflective of the organization and structure of the universe. Theology was seen as related to the most ultimate dimension of life, to the most inclusive level of analysis, suggesting the reign again of theology as the queen of the sciences. Thus psychology was subsumed under theology. A third approach sought to cipher out of psychology fundamental assumptions, either implicit or explicit, about the nature of human existence that could be viewed as equivalent to assertions made in biblical anthropology. The assumptive framework within psychology could thus be brought into dialogue with the assertions of faith in theology. A fourth approach Collins labels the "Spoiling the Egyptians" approach. Here, like the Hebrews in their exodus out of Egypt, we are encouraged to take what is valuable and leave the rest. Using the Scripture as our guide, we test and weed out those elements of psychology that conflict with the "infallible, inspired, inerrant revelation" of Scripture. Little is said about how these Scriptural guides are known and used. Finally, Collins presents his own model, one he describes as the "Rebuilding Approach." The best way to describe this model is to call it an evangelical psychology, that is, a psychology built upon an evangelical Christianity. Collins neatly spells out the fundamental evangelical assumptive framework, which includes expanding empiricism to include Biblical revelation. Psychology would be incorporated into an evangelical framework.

Except for reasons of personal faith or sympathy, no argument is advanced as to why one model is more usable or desirable than another. Collins's own proposal ends up rejecting psychology as an independent discipline, viewpoint, or field. Psychology is set up as a straw man with its shifting sands of "humanism, relativism, and materialism" (pp. 33-36). While Collins denies that he has dismissed psychology, his proposal clearly leads to that conclusion. However, there is value in his review of differing models. It identifies some specific models that are being advanced and it raises the important questions of methodology, the fundamental questions that must be addressed if any project of integration can proceed. It is clear in my discussion above that I feel Collins has evaded dealing with the hard methodological questions. What are the common grounds and concerns of theology and psychology? How are these two perspectives alike and different? How are they related? Is there a way of finding a common level of analysis, concreteness, or abstraction that would make dialogue possible between equals? How does adherence to a confessional faith and an evangelical biblical perspective limit or enhance the possibility of integration? Collins has resorted to arguing from a personal pietism rather than taking seriously the problems at the theoretical level. For the kind of approach I am suggesting, see Don S. Browning, *Atonement and Psychotherapy* (Philadelphia: Westminster Press, 1966) and Thomas C. Oden, *Kerygma and Counseling* (Philadelphia: Westminster Press, 1967).

The second and third chapters proceed to lay out what Collins sees as the practical implications of his model for Christian psychologists, whether involved professionally, pastorally, as a layperson, apologetically, preventatively, or publicly. The value of these reflections rests in the scope identified for discussion and not so much in the specific suggestions made.

Chapter four adds to the usefulness of this book by presenting a number of expansions and criticisms of Collins's model. Collins's response to his critics, however, leaves the reader wondering whether he understood what they were pointing out. For a book that promised much, the reader is left unsatisfied and still wondering whether the integration of psychology and theology is possible without a reductionism or annihilation of either psychology or theology.

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*Science and Moral Priority: Merging Mind, Brain and Human Values.* By ROGER SPERRY. New York: Columbia University Press, 1983. 150 pages. \$16.95.

This is a collection of essays authored over the period of the last fifteen years by Nobel prize-winning psychobiologist Roger Sperry. Edited and revised for this volume, these essays bring together Sperry's views on the ethical, philosophical, and religious implications of the recent advances in the cognitive sciences. These include his own major contributions both to an understanding of how the brain inherits and develops neural networks for behavior without the aid of function and to studies of split-brain phenomena and hemispheric specializa-

[*Zygon*, vol. 19, no. 2 (June 1984).]

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tion. Sperry contends that these advances in the cognitive sciences demand radical revisions in widely accepted religious and philosophical views on the mind-body problem and the foundations of values.

Sperry argues that the soundest scientifically based position concerning the mind-body problem, though one not yet supported by direct empirical evidence, is mentalism. Mentalism is the position that conscious, subjective states play a causal role in human behavior. These states, though intrinsically dependent on brain states, are emergent organizational features of brain states. Thus, on the one hand, Sperry rejects mind-brain identity theories and reductionistic materialism, and, on the other hand, he also separates himself both from classical religious and philosophical dualistic positions as well as the contemporary dualistic position of John Eccles and Karl Popper, a position claimed by these theorists to be based on current findings in the cognitive sciences. Sperry's view then is monistic: there are no nonphysical or supernatural entities, properties, or states. However, it is also nonreductionistic in both substantive and methodological senses of that term. The mind is an emergent reality distinct from the brain and interacts with it in a causal fashion, and the laws governing conscious subjective activity are distinct from those governing lower-level activities. The former supervene on the latter, that is, although they do not normally intervene or contradict the laws at lower levels, they do determine the overall activity of the person and thereby specify and direct lower-level laws. Thus Sperry holds for a nondualistic interactionism.

Sperry sketches this position in several chapters of this volume, but most completely in chapter 6, "Mind-Brain Interaction: Mentalism, Yes; Dualism, No," in which he recounts his own gradual turning from a reductionistic mind-brain identity theory to his theory of mentalism. Here also he separates himself from both the dualism of Eccles and Popper and the double aspect theory of Donald Mackay. Sperry's position rests on two interconnected key premises: first, the causal role of conscious states in human behavior and, second, the conceptualization of the subjective conscious states as an emergent level of reality. Although the first premise is an almost indubitable conviction of common sense and an a priori truth of the nonscientifically oriented Anglo-American linguistic and continental phenomenological traditions in philosophy, it has been rejected by behavioristically oriented scientists and philosophers. But the work of Sperry and others in neuroscience, advances in cognitive psychology, including cognitive behavioral psychology and research in artificial intelligence and cognitive simulation have given major scientific support to the hypothesis that conscious states have a causal role. The second premise concerns the standing of consciousness as an emergent reality. The case is much harder to make for this premise and although I am in fundamental agreement with Sperry and the emergentist position, I believe that much work still needs to be done both in clearly conceptualizing the emergentist position and supporting it. For an important attempt to do this I recommend highly William Wimsatt's sympathetic and penetrating analysis of Sperry's views in his essay, "Reductionism, Levels of Organization, and the Mind-Body Problems" (in *Consciousness and the Brain*, ed. G. Globus, G. Maxwell, and I. Savodnik [New York: Plenum, 1976], pp. 205-67). Sperry bases his position in large measure on an analogical argument. He contends that consciousness is an emergent property of brain functioning in the same fashion as molecules are emergent relative to atoms, cells to molecules, tissues to cells, and organs to tissues. In each instance the emergent reality with its properties determines in some degree the activities of its parts. Each level has its own properties and

activities and there are lawful intralevel and interlevel activities. I find this argument attractive, and I believe that some good clues for understanding consciousness as an emergent property are to be found in examining other cases of emergence. But, as it stands, it is more of an argument sketch and a heuristic program than a completed position. I believe that Sperry would agree with this assessment.

Sperry also contends that mentalism has profound repercussions for value theory. For if the theory that conscious thought has a function in behavior is correct, then we must conclude that the cognitive sciences have an important role to play in the identification, specification, and understanding of the role of values in human behavior. Indeed, it is now possible to speak of a science of values (p. 13). Although he does not discuss their views, here Sperry is taking the side of two other very prominent scientists of our day, the behaviorist, B. F. Skinner, and the sociobiologist, Edward O. Wilson, in arguing that the dichotomy between fact and value is a false one and that we can no longer refrain from using our best cognitive tool, science, in the solution of our contemporary crises in values. Sperry, however, attempts to establish this intersection between science and values in a somewhat different fashion than Skinner and Wilson. A distinction developed by the noted biologist Ernst Mayr, among others, may be helpful here in understanding this difference. Mayr has argued that there are two major streams in biological thought: the functional and the evolutionary. The latter attempts to answer why-type questions and deals with ultimate causation. The former focuses on how-type questions and deals with proximate causation. (See Mayr's *The Growth of Biological Thought: Diversity, Evolution and Inheritance* [Cambridge, Mass.: Harvard Univ. Press, 1982].) Skinner and Wilson have urged that behavioral psychology and sociobiology respectively can provide information about and understanding of human values because each in its own way describes and explains what is valuable for members of the human species and explains why these values are valuable. Behavioral psychology does so in terms of its identification of reinforcers and sociobiology in terms of the genetically based motivators of human behavior. And although Skinner has stressed strongly the prominence of environmental factors in behavior, a synthesis of the Skinnerian and Wilsonian positions is not, I believe, hard to envision especially since Skinner himself appeals to evolutionary theory as an ultimate explanation of why reinforcers are reinforcing. (See, for instance, Skinner's *Beyond Freedom and Dignity* [New York: Bantam Books, 1972], p. 99.) Sperry's notion of a science of values complements those of Skinner and Wilson. It is, to use Mayr's distinction, a functional science of values. For Sperry is interested in how values as subjective conscious states play a causal role in determining human behavior. Thus there is, I believe, broad agreement among these eminent scientists that science, in particular biology and psychology, can make substantive contributions to our knowledge and understanding of values and that the methodology of science is an appropriate one for the investigation of ethical problems, and especially for laying the foundations for ethics and value theory. It is no news to readers of *Zygon* that this is a controversial position. Despite the genuine philosophical problems with this position to which Sperry perhaps gives too short a shrift, I am in fundamental agreement with it and believe Sperry's essays in this volume add further support for it.

But there are also other important differences, besides the functional-evolutionary one, between Sperry's position and those of Wilson and Skinner that help bring out the distinctiveness of Sperry's views. I shall mention just

three, two related to Skinner and one to Wilson. First, Sperry is, of course, very critical of the behaviorist position because it denies a causal role for thought in human behavior and makes thought epiphenomenal. In this connection let me point out parenthetically that the work of the cognitive behavioral psychologists gives some positive indication that a liberalized behaviorist approach that includes a causal role for thought can be integrated with Sperry's mentalism. However, since Sperry identifies values with subjective states of human persons, he believes that the behaviorists not only deny a causal role for thought in behavior but must necessarily lack any account of values. However, this conclusion does not follow. Skinner identifies values with primary and secondary reinforcers and these latter with such objective factors as persons, situations, objects, and activities. And these objective, environmentally situated values can be correlated with the subjective values with which Sperry is concerned. Indeed Sperry on several occasions makes a similar distinction between external and internal value constraints (for instance, p. 70). Thus I believe that Skinner's and Sperry's positions complement and reinforce one another. Indeed, I contend that the evolutionary approach implicit in Skinner and explicit in Wilson must be added to Sperry's functional account for without it the crucial teleological dimension needed in a naturalistic ethics of the sort that Sperry is supporting fails. Put too succinctly, the functional account which Sperry has in mind can explain at most only how what an agent considers or finds valuable influences her behavior, but not why such values are valuable. The teleological approach can explain why such values are valuable in the sense that it gives an account of why they promote the well-functioning of the agent as a human organism or the well-functioning of the community to which she belongs.

A second difference between Sperry and Skinner also derives from their differences on mentalism. Although both Sperry and Skinner believe that the crisis of our times is fundamentally one of values and that the solution of such problems as overpopulation, environmental degradation, poverty, and the nuclear arms race depend upon a solution to this values crisis, their differing perspectives on values and the causal role of thought in human behavior lead to quite different conceptions of the means by which a science of values can function in the solution of the values crisis. Skinner calls for a technology of behavior based on a science of values. Thus he believes that we must learn, both individually and collectively, how to structure the secondary reinforcers that influence our daily activities so that these activities lead us step by step to the solution of our major social problems. Skinner's position calls for personal and collective self-management based on learned behavioral skills which incorporate the values identified by a science of values. Sperry's approach on the other hand is much more rationalistic. Indeed, he believes that a change in values alone is the key from which a solution to our problems will flow. "It might be added that any attempt to attack directly the overt symptoms of our global condition—pollution, poverty, aggression, overpopulation, and so on—can hardly succeed until the requisite changes are first achieved in the underlying human values involved. Once the subjective value factor has been adjusted, corrections will follow readily in the more concrete features of the system" (p. 10). And, he claims, "simple logic says that future alterations in this single factor [the subjective value factor] alone could spell the difference between utopia and social disaster" (p. 11). These changes, Sperry believes, demand first of all an alteration in world views from either an other-worldly religious view of persons and nature or from a reductionistic, deterministic picture to a humanistic and naturalistic conception that understands persons to be free

agents and important but subordinate actors in nature and the universe. Such a shift in world view, based on newly emerging scientific conceptions, including Sperry's own emergentist mentalism will, he believes, lead to the adoption of appropriate ethical principles. These will function in the manner of basic axioms from which subordinate value principles and norms can be deduced. The result will be actions that are supportive in the long run of the creative trends in the evolutionary and cosmic processes (pp. 75-76). In other words, Sperry stresses changes in our evaluative thinking and Skinner changes in our value-laden environment. Cognitive behavioral psychologists are now providing scientific evidence that these alternatives are not exclusive. But, if I read them correctly, they are suggesting that the changes in both behavior and values, required by both approaches, will result from informed practice rather than from a change in thinking alone. How and what we value is not primarily a function of thinking but of acting.

A third difference between Sperry's functionalist account of values and the evolutionary approaches of Skinner and Wilson relates primarily to Wilson and the content and source of basic values. The three cardinal values proposed by Wilson in *On Human Nature* (Cambridge, Mass.: Harvard Univ. Press, 1978) are, first, the preservation of the common human gene pool, second, the maintenance of diversity in the human gene pool, and third, universal human rights. According to Wilson these values are based in our biological nature and are discovered and explained, in part, by the biological sciences. Although Sperry recognizes the existence of a biologically based set of common values among humans, these are, in his view, related to our animalistic nature and are not his primary concern. He is interested in what he calls cognitive values, our higher aspirations which he believes are closely linked to our conceptions of the ultimate meaning of human life and of the universe. Thus he finds both sociobiological and Marxist scientific accounts of values to be limited and ultimately inadequate because they are based on reductionistic materialist views of persons. Although I believe Sperry's understanding of both Karl Marx and the sociobiologists is flawed, let me pursue only the comparison with Wilson. Sperry proposes as a tentative basic ethical principle the following: "What is good, right, or to be valued morally . . . [is] that which is in harmony with, sustains, or enhances the orderly design of evolving nature including its human apex" (p. 50). Thus, according to Sperry, "The 'highest good' becomes expressed in terms of fitting in and contributing to the grand design of the creative process, i.e., furthering the progressive overall improvement in the diversity, meaning and quality of existence" (p. 56). Sperry's definition of the good is evolutionary in a broader sense than Wilson's cardinal values since it concerns evolutionary processes as a whole and presupposes both that they have a direction and that that direction can be discerned. Wilson, on the other hand, conceives of values as more narrowly based on the maintenance and promotion of the human species. I suspect that Sperry is correct and that some broader principles than those proposed by Wilson are necessary if we are going to solve the environmental problems with which we are faced in such a way that both animate and inanimate nature is respected. But such a principle as Sperry's is much more difficult to defend scientifically than Wilson's, and indeed Sperry offers no satisfactory defense for it.

A number of consequences flow from Sperry's mentalism and science of values. I shall mention and comment briefly on two. First, science can now be reconciled with a humanistic perspective, and also there is now a possibility for a new harmony between religion and science. The first consequence rests on

the new perspective on persons deriving from the results of the cognitive sciences, in particular, the important causal role attributed to subjective consciousness in human behavior. Thus the humanistic emphasis on the importance of thought, feeling, emotion, and freedom is reaffirmed. I believe this new coincidence in humanistic and scientific views of human persons is, indeed, in part a consequence of the new results in the cognitive sciences and worth noting. However, the reconciliation will not be as easily attained as Sperry might think for there seem to be fundamental differences in humanistic and scientific methodologies that will need explanation if we are to have an adequate understanding of the fundamental unity of human cognitive capacities and endeavors. Also, it is not clear to me that our ordinary, nonscientific conceptions of human thought, emotion, feeling, and freedom and their humanistic refinements will be saved *in toto*. For instance, the notion of freedom implicit in Sperry's account is that of soft determinism. Such a conception of freedom is not completely identical with the common sense or humanistic conceptions of freedom.

A second major consequence of mentalism and a science of values is the opportunity for establishing a new harmony between religion and science. This harmony is possible not merely because the cognitive sciences offer a conception of persons as thinking, free agents and promote a science of values in large part, according to Sperry, in agreement with traditional religious values but also because the new, scientifically based world view demands some conception of the transcendent. Such a conception will embody a new understanding of the sacred that embraces all the forces operative in the universe including human thought. Sperry contends that the direction of these creative forces calls for our ultimate respect and concern. I think Sperry is correct in his assessment of a need for some conception of the transcendent to supplement mentalism and a science of values, but I believe he is overly optimistic in his estimation that this new scientific world view can be in large part reconciled with traditional religious conceptions. For, as he recognizes, it demands among other things the abandoning of the classic western conception of God and the otherworldly conceptions of the human person common to both east and west. In large degree such changes are not a reconciliation with traditional religion but its replacement with a new religious perspective. On the other hand, I am not convinced that Sperry pushes the religious implications of his view of the creative cosmic processes as much as he might. Why should we not expect higher levels of emergence than the unities typified, for example, by human persons? I am far from arguing that scientific support can be given for the existence or coming to be of such higher unities, but it is not clear to me why Sperry cuts off his conception of the transcendent with what appears to be a diversity of distinct cosmic forces rather than envisioning higher level unities or indeed a single cosmic unity.

There is much more that is worthwhile in this slim volume. Sperry's work fosters a kind of dialogue between scientists, philosophers, theologians, and interested lay persons that is extremely important these days. It is open, exploratory and extremely stimulating. I would hope that the publishers of this volume would see fit to bring out an inexpensive paperback edition. It deserves wide circulation.

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*Religion: A Secular Theory.* By ANDREW M. GREELEY. New York: Free Press, 1982. 192 pages. \$15.95, \$7.95 (paper).

Andrew Greeley offers both a secular and a social scientific theory of religion. By a theory he means an explanation of the origin and function of religion. By a secular theory he means a natural rather than supernatural origin and function. By a social scientific theory he means an empirical rather than metaphysical origin and function.

Both the secular and the social scientific characteristics of Greeley's theory preclude God as, directly or indirectly, either the cause or the object of religion. More accurately, both characteristics, for Greeley, ignore rather than preclude God. Greeley blithely assumes that the social sciences and belief in God are compatible. When the social sciences rightly confine themselves to natural and empirical matters, they have no bearing on supernatural or metaphysical ones.

Like most other twentieth-century social scientists, Greeley assumes, first, that a social scientific explanation of religion does not preclude a believer's own, presumably supernatural or metaphysical, one. To justify his view Greeley appeals merely to his personal refusal to assess a believer's explanation. Whether a social scientific explanation is in fact compatible with a believer's, not whether Greeley wants it to be, is the real issue.

Like most other twentieth-century social scientists as well, Greeley assumes, second, that a social scientific explanation of religion does not preclude the truth of religion. A social scientific explanation, he assumes, determines why believers believe God exists, not whether God exists. To justify his view Greeley could, like many others, appeal to the genetic fallacy, but instead he again invokes merely his personal refusal to assess the truth of religion. The real issue here, too, is whether a social scientific explanation is in fact compatible with the truth of religion, not whether Greeley wants it to be.

By the origin of religion Greeley means not, like most nineteenth-century social scientists, the one-time, historical beginning of religion but, like most twentieth-century ones, its recurrent origin. Doubtless he, like others, would oppose the quest for the historical origin of religion on empirical grounds: that it is unobservable and therefore unknowable. If so, he would be precluding any reliance, as in even the natural sciences, on indirect observation.

Like nearly all other social scientists, Greeley identifies the recurrent origin of religion with a need. The function of religion is the fulfillment of that need. Religion therefore arises intentionally: it arises to serve its function. An intentional origin need not be a conscious one: believers can unconsciously create religion to serve its function. An intentional origin precludes only an accidental one: religion serving a function different from the one it was consciously or unconsciously created to serve. Among social scientists, only social functionalists like Émile Durkheim and A. R. Radcliffe-Brown deem the origin of religion accidental. Greeley himself does not raise the possibility.

Like most other social scientists, Greeley attributes religion to a universal need. Among major social scientists, only Karl Marx, Sigmund Freud, and Carl Jung consider the need religion serves less than universal: the need exists only as long as human beings are economically oppressed, sexually repressed, or spiritually unconscious. At the same time few social scientists consider religion a universal means of satisfying the need it serves. Among major social scientists,



only Durkheim does so. Greeley's functionalist definition of religion, to be considered shortly, circumvents the issue of universality by labeling religious whatever phenomenon satisfies the universal need he finds.

That need is for hope, hope for a meaningful life. Meaningfulness takes various forms: the conviction, for example, that life has a purpose, that the world is just, or that an afterlife exists. To say that human beings "hope" for meaningfulness is, for Greeley, to say that they find it. As he uses the ambiguous term, to hope for meaningfulness is to discover, not merely seek, it.

Whatever belief satisfies the need for meaningfulness is, for Greeley, religious. Like many other twentieth-century social scientists, he thus defines religion functionally rather than substantively: by its effect, not its content. Marxism, psychoanalysis, and feminism are among the beliefs he pronounces religious. How these nonmetaphysical beliefs can fully provide purpose to life, justice to the world, or an afterlife Greeley scarcely says.

Greeley distinguishes between the experience of hope and the reaction to it. The reaction is the institutionalization of religion—in the form of, in order of development, symbols, stories, myths, rituals, creeds, and doctrines. These expressions of religion serve several functions: they articulate, validate, interpret, and summon religious experience.

Just as religious belief need not, for Greeley, be supernatural or metaphysical, so religious experience need not be. Activities like listening to music, reading, walking, and even sex can be religious. To qualify, an experience need only be of something other, not, supernaturally or metaphysically, of the Other. How, again, a nonmetaphysical other can fully satisfy the need for meaningfulness Greeley never explains.

Greeley usually presumes two traditional distinctions which have recently been questioned: first, between religious experience itself and the interpretation of it, and second, between spontaneous and institutionalized religious experience. First, not only various contemporary social scientists but also various contemporary philosophers deny the assumption that experience of any kind is raw and unmediated. Interpretation, they contend, shapes the experience itself and not just the explication of it. Second, symbolic anthropologists, especially Mary Douglas, deny the equally romantic assumption that only spontaneous experience of any kind is genuine and that institutionalized experience is artificial. Institutionalized experience, contends Douglas, not only can prove as stirring as spontaneous experience but is the sole kind of experience possible for most persons. Greeley confronts neither of these challenges to his implicit assumptions.

Although a sociologist, Greeley argues that religion arises in the individual, not the group, and serves the individual, not the group. He is here most like Max Weber, for whom religion likewise both originates and functions individually, and least like Durkheim, for whom it both originates and functions socially. For Greeley, as for Weber, religion becomes social, or institutionalized, as merely a means to its individual end: the articulation, validation, interpretation, and evocation of religious experience. Social factors do partly determine whether one has religious experience, but the need for it is exclusively one's own.

Greeley's basically existentialist theory of religion is largely unoriginal, as he himself recognizes. The classic social scientific exponent of it is Weber. Contemporary exponents include Talcott Parsons, Peter Berger, Thomas Luckmann, Robert Bellah, and Clifford Geertz. Another classic exponent is the Freud of *The Future of an Illusion* (trans. W. D. Robson-Scott, rev. James

Strachey [Garden City, N.Y.: Doubleday Anchor Books, 1964]). The key difference between Freud and other exponents, including Greeley, is that he bemoans and they applaud the function religion serves.

Greeley vaunts the originality less of his theory itself than of his validation of it. He contemptuously dismisses Berger and Bellah above all for the non-verifiability of their claims. In support of his own claims he first cites psychological evidence that a noninstinctual preconscious harbors the need to hope. He then cites polls showing that most human beings do indeed hope. Having ascribed the need to hope to the preconscious, he credits the capacity to hope to a happy childhood and a happy marriage. The happiness of both he associates with sexual happiness. He cites polls correlating sexual happiness with hope.

It is surely not easy to verify the existence of either a preconscious need to hope or the presence of hope. The questions used to determine the existence of hope among those polled are, for example, exceedingly general. Moreover, the correlation of sexual happiness with religiosity would not prove causality. Even if it did, Greeley would at most have established the cause, not the function, of religion: he would have proved that happy sexuality causes religiosity, not that religiosity causes meaningfulness.

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*The Turning Point: Science, Society, and the Rising Culture.* By FRITJOF CAPRA.  
New York: Simon & Schuster, 1982. 464 pages. \$16.95.

Nine years ago, Shambhala, an eastern religions publisher then in Boulder, Colorado, published an unusual book by a Berkeley physicist. *The Tao of Physics: An Exploration of Parallels Between Modern Physics and Eastern Mysticism* (Berkeley: Shambhala, 1975) received almost no reviews but sold amazingly well, not only to the usual readers of Shambhala books but also to engineers, Caltech graduate students, and that segment of the general population that a few years later would be reading Carl Sagan. The question with which Fritjof Capra ended *The Tao of Physics* is the question with which he begins this book, namely, "not *whether* these parallels exist, but *why*; and, furthermore, what their existence implies."

The thesis of Capra's new book is that where physics has been, there biology, medicine, psychology, and economics will be, and with them all of society. The book may be compared loosely to Alvin Toffler's *The Third Wave* (New York: Bantam, 1981), but where Toffler announces, Capra exhorts. Toffler works from government and corporate information, and, dealing largely with the impact of technologies already on hand, he reads the future breathlessly: "Ready or not, here it comes!" Capra's future has not yet quite happened. Drawing on a mix of straight science and "alternative" research, he calls on scientists in the four fields he examines to *make* it happen, that is, to round the great turn from hard, mechanistic, reductionistic science to soft, organic, systems-view science. If Capra cannot make this turn seem inevitable, he does make it seem inviting.

[*Zygon*, vol. 19, no. 2 (June 1984).]

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Why is "hard science" called hard anyway? Capra quotes Isaac Newton: "It seems probable to me that God in the beginning formed matter in solid, massy, hard, impenetrable, movable particles, of such sizes and figures, and with such other properties, and in such proportion to space, as most conducted to the end for which he formed them, and that these primitive particles, being solids, are incomparably harder than any porous bodies compounded of them, even so very hard, as never to wear or break in pieces" (pp. 65-66). Newton's physics was so impressive that for two hundred years not just physicists but all scientists joined him in assuming hard particles exist (if not a creating God) and in striving to explain physical phenomena mechanically.

During the first quarter of the twentieth century, however, physics underwent what we might call an invasion of the body-snatchers. The quantum theory of subatomic physics—the collective creation of Max Planck, Albert Einstein, Niels Bohr, Werner Heisenberg, and others—"called into question the very foundation of the mechanistic world view—the concept of the reality of matter" (p. 80). Newton's hard particles went soft, then went away. Capra quotes Bohr: "Isolated material particles are abstractions, their properties being definable and observable only through their interaction with other systems" (p. 80).

In our own day the world view of physics has moved even farther from the one we still instinctively think of as scientific. Geoffrey Chew's "bootstrap approach" to physics, for example, "not only abandons the idea of fundamental building blocks of matter, but accepts no fundamental entities whatsoever—no fundamental constants, laws, or equations. The universe is seen as a dynamic web of interrelated events" (pp. 92-93), in which "every particle consists of all other particles" (p. 94). David Bohm's theory of implicate order goes Heisenberg one better: not only does the observer affect the observed, the observer *is* the observed; the two are inseparable. Physics faces "the unprecedented possibility of being forced to include the study of human consciousness explicitly in future theories of matter" (p. 95) and can no longer claim to be the basis of all science. Rather, Capra concludes, "different and mutually consistent concepts may be used to describe different aspects and levels of reality, without the need to reduce the phenomena of any level to those of another" (p. 97).

Some have claimed that no such inferences should be made from quantum physics to the nature of science itself. Heisenberg's *Physics and Philosophy: The Revolution in Modern Science* (New York: Harper & Row, 1958) was criticized by those who reasoned that, since quantum physics applied only to a limited range of phenomena, the rest of science could proceed as usual. In my opinion and evidently in Capra's as well, these critics missed Heisenberg's point. If quantum physics was of limited applicability, then so, necessarily, was Newtonian physics, and, more important, the precise limitations of the Newtonian model remained to be determined. The situation in science was analogous to what the situation would be in Roman Catholicism should the infallible pope admit an error. It simply would not do, past that point, for the church to claim that the pope was infallible in all areas except the one in which he was fallible. The proper inference would be that the limits of his fallibility remained to be determined.

The great distinction of physics is that, as the first science to learn the lesson that more than one model is necessary and that all are limited, it may have been first around a turning point that several other sciences are now approaching.

Consider biology. Biologists have discovered the gene, the atom of their science, Capra says; but their exploration of the gene has not led—as the exploration of the atom did—to a comprehensive revision of basic concepts. Capra thinks the revision will come when biologists stop thinking small and start thinking big. He is in sympathy with the Gaia hypothesis, which states that our planet (*gaia* is Greek for *earth*) “functions not just *like* an organism but actually seems to *be* an organism,” every one of whose tissues is linked to every other tissue (p. 285). In such a living system, there can be no phenomenon that is not molecular but none, either, that is *only* molecular.

In medicine Capra foresees the passing of the biomedical model, “according to which diseases are well-defined entities that involve structural changes at the cellular level and have unique causal roots” (p. 150). The emerging systems view makes room for multiple causes and complex cures. Nutritionists, psychologists, public health officers, and the patient will all contribute to them. Just as the quantum physicist, bereft now of Newton’s “solid, massy, hard, impenetrable, movable particles” (p. 65), is no longer the ultimate scientist, so the physician bereft of Lewis Thomas’s “single key mechanism” (*The Medusa and the Snail* [New York: Viking, 1979], pp. 168ff.) for each disease, will no longer be the ultimate authority in health.

Among competing psychologies Capra finds both behaviorism and psychoanalysis too mechanistic. “Psychology,” one early behaviorist wrote, “is a purely objective, experimental branch of natural science which needs consciousness as little as do the sciences of chemistry and physics” (p. 173, quoting John B. Watson, *Behavior* [New York: Holt, 1914], p. 27). But if the more recent laws of physics cannot be stated without reference to consciousness, then can the laws of experimental psychology? Having cut the ground out from under itself, physics also has cut the ground out from under its imitators, among whom Capra numbers Sigmund Freud, who wrote, “Analysts are at bottom incorrigible mechanists and materialists” (p. 180, quoting “Psychoanalysis and Telepathy” in *Standard Edition of the Complete Works of Sigmund Freud* [New York: Hogarth Press, 1921], 18:178ff.). Psychology past the turning point may become a welter of superficially contradictory therapies and mind-control techniques. Capra, an habitu  of Esalen, does not find this situation inherently unscientific. A systems view of psychology can and must make room for more than one explanatory scheme.

In his role as an economist Capra professes himself much influenced by Hazel Henderson, whose work seems to announce the end of economics. Like her, Capra has no place in his systems view of society for a social science that ignores so many of the real determinants of what it studies. He takes his stand for a frankly political economics, something like Marx without the class struggle. Economic problems, as he sees them, can have no merely technical solutions (“trickle down” is a technical solution) but only technical-political-social-moral solutions.

*The Turning Point* is a crowded, busy book. Having educated himself in several fields besides physics, Capra now sets out to educate his readers, employing a “language of the layman” so rigorously enforced that it begins to sound like the language of the lay child: not only “alpha particle” but also “lesion” and even “social science” are defined in footnotes. It is plain that his intended audience is not the expert audience that will carry science past the Capran turning point but rather an even broader, more popular audience than the one that bought *The Tao of Physics*.

Will he reach this audience? I wonder. The earlier book seems to me to have spoken to a certain hope, not the least among the technically educated, that the great discoveries of natural science could be made to speak to the heart. The new book does not speak to that hope, or does not speak so simply. Its tone is not contemplative but reformist. The *tao*, the ancient Chinese "way," counsels equanimity. *The Turning Point* urges action.

To take just one example, Capra backs Barry Commoner's scheme for shifting to a solar economy via a transition period of dependence on natural gas. Taken as a system, Commoner's solar economy might reflect the Taoist cosmology better than our expansionist fossil-fuel economy does, but nothing could be less Taoist in personal style than Capra and Commoner campaigning for this economy.

The spirit of the new book, in other words, is not the ironic, reclusive spirit of Lao Tzu but the spirit of the Jesus who said, "Blessed are they who hunger and thirst for justice" (Matthew 5:6). Capra hungers and thirsts for justice via a paradigm shift in the several sciences he has now studied, followed by a "whole earth catalog" of corresponding social changes.

If and when that shift occurs and those changes are made, someone may write the *tao* of biology, the *tao* of medicine, the *tao* of psychology, the *tao* of economics, and finally the *tao* of science and society. At that point the human spirit may well be able to take up residence in the science-made world in a way that until now has not been possible. Reaching that point, however, seems to call for something like the *tao* of salesmanship.

The phrase "the *tao* of salesmanship" is intended less flippantly than it might seem. If inner peace is the supreme good, then should one disturb it even to *spread* inner peace, much less to spread outer peace? It was the pressure of this question that generated Mahayana Buddhism from its Theravada Buddhist roots. The Bodhisattva of Mahayana Buddhism is the enlightened Buddhist renouncing peace (*Nirvana*) temporarily in order to spread it to others by skill in means (*upaya*) or what we might almost call the *tao* of salesmanship.

The ethical question remains, however, a central and difficult question in Buddhism as in any religion founded on acquiescence in a great fact rather than on mobilization for a great effort. Christianity, strictly speaking, does not seek enlightenment. At the judgment scene in Matthew 25, when the virtuous sheep are separated from the sinful goats, the sheep confess their ignorance: they did not know what they were doing; they are nonetheless an ideal. The Bodhisattva, by contrast, knows exactly what he is doing and would not otherwise be a Bodhisattva. But to know what he is doing is to know that he need not do it, for to the enlightened Buddhist being or not being a Bodhisattva must be a matter of indifference. *All* desire, even this one of bringing peace to others, is extinguished, and there can be no question of ethical obligation.

The challenge to Buddhism is the construction of a social ethic on such an all-quieting mystical foundation. One recalls that Buddhism never replaced the ago-old Hindu dharma in India, that it joined Taosim but never replaced Confucianism in China, and that it entered a unique symbiosis with Shinto in Japan. Perhaps Buddhism is possible only as the mystical complement to a religion or a social code that makes more prosaic and unequivocal demands.

If so, then the *tao* or *zen* of science is something less than the reconciliation of science and religion; it is merely the reconciliation of science and mysticism. Nonetheless, a unified aesthetic reappropriation of science along the lines that Capra suggests may eventually be of greatest religious interest, precisely by

happening into these difficulties. For as it does so, it may open the way for Western ethical thought, still trapped in an is/ought dilemma precipitated by science, to make use of Eastern solutions to that dilemma. Although he does not use the phrase, Capra's physics is almost exactly the *pratitya-samutpada* or "co-dependent origination" of Buddhism. What Capra might want to ponder further is the fact that the blank, mute factuality of this concept presented to Buddhism centuries ago the same practical problem that the ethical silence of natural science has more recently presented to secular Western society.

In a sense, the problems of Christianity and Buddhism in this regard are mirror images of each other. Christianity began with an intact ethic, and then—as post-Christian Western culture—it had to adjust to a cosmology that seemed beyond ethics. Buddhism began with a cosmology that seemed beyond ethics and somehow has had to derive an ethics from it. Christianity makes a leap of faith and then gets its ethics from God. Buddhism has no god, or at any rate no divine lawgiver, and so has to leap to its ethics in another way. The fourth of the Noble Truths of Buddhism, the one which enjoins "right living" as a step on the eightfold path to enlightenment, is the one that does not follow logically from its view of world.

In the opening sentences of *The Tao of Physics* Capra speaks of a mystical experience in which he re-experienced his physics as "the Dance of Shiva, the Lord of Dancers worshipped by the Hindus" (p. 6). We are mixing Hinduism, Taoism, and Buddhism shamelessly, but let us continue. If we call that experience Capra's *bodhi*, his enlightenment, then was his refusing to linger with it a betrayal of it, a re-entrapment in the egotistical bustle of university science and New York publishing? Or was that refusal, that is, his determination to write these two visionary books, an ethical renunciation imposed upon him by that experience? If it was the latter, then the writing of the books was an ethical duty imposed by a vision of science. An *ought* was derived from the *is* of quantum physics, mystically appropriated.

Of this derivation I should think that Capra might eventually want to say more, for it portends more than any particular development in the several disciplines he has considered in his new book. This derivation, if he has made it consciously enough, would be the real turning point.

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