

Reviews

Meaning and Purpose in the Intact Brain: A Philosophical, Psychological, Biological Account of Conscious Processes. By ROBERT MILLER. Oxford: Clarendon Press, 1981. 239 pages. \$34.50.

Someone once irreverently defined a philosopher as a blind man in a dark room looking for a black cat that isn't there. At least until now, the same might be said for the efforts of contemporary neuroscientists to resolve such philosophical issues as the location within the brain of the self or the seat of consciousness. Certainly, at this juncture, it would be difficult to disagree that neuroscience—at least Neuroscience writ large—is not sufficiently developed for such an enterprise to succeed. Nor is it at all certain that further advances will make the cat in the darkness that much easier to discern. Presumably, after we have solved all the technical questions, we still have to grapple with the limitations imposed on us by the dark room of our language and our thought. Even this does not quite spell the end of our difficulties: we still have the question of deciding if the black cat is really there or not. In short, after we have looked into and explored the human brain as deeply as we wish, is it likely that we are going to turn up anything even remotely related to the kinds of things we mean (or think we mean) when we talk of a self, consciousness, a mind and so on?

In this book Robert Miller grapples with these so far unanswered and perhaps unanswerable questions. As a starter, Miller discusses the innate subjectivity of even our most scientific and objective judgments. As an example, Miller quotes Erwin Schrödinger on why an observer can never be entirely replaced by his instruments. "The observer is never entirely replaced by instruments; for if he were he could obviously obtain no knowledge whatsoever. . . . Many helpful devices can facilitate this work, for instance, photometric recording . . . on which the position of the lines can be easily read. But they must be read! The observer's senses have to step in eventually. The most careful record, when not inspected, tells us nothing" (p. 13).

Even our assessments of probability rest on heavily subjective judgments. In Miller's words, "In the end, the decision to accept a probability of less than 0.05 rather than one of less than 0.0001 as a criterion of significance is not objective. Presumably, it depends on inbuilt subjective intuitions about probability" (p. 13).

As Miller makes clear at a later point, such distinctions represent far more than mere hairsplitting. For one thing, practical judgments about meaning and purpose flow naturally from our concepts of what kind of data are truly objective. As an example, consider the well-studied phenomenon of intracranial self-stimulation: a conscious animal with electrodes implanted in its brain repeatedly stimulating its own brain. How does one explain such behavior? To Miller, the most popular explanation—that the animal performs self-stimulation because it is pleasurable—is "no more than a tautology." "The only

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possible way in which the word 'pleasurable' could be defined for a scientist is 'that which an animal will strive to experience again' which the experimenter already knows" (p. 16).

These preliminaries dispensed with, Miller gets down to his main theme: How meaning is encoded within the human brain. "Information can be represented only in a structure where there is no constraining principles of connectivity between the component parts" (pp. 59-60). Miller suggests that the brain fulfills this requirement because it is a "random network in which all parts are in potential functional contact with all others" (p. 60). Miller, in the tradition of Donald Hebb, suggests that the brain is a system of "diffusely connected neural networks in which every neuron has the potentiality of influencing every other" (p. 181). Such an "omniconnected network" depends on multiple connections between neurons.

As Miller points out, network theories of brain function increased in popularity as neuroscientists learned more about those large blocks of subcortical gray matter—the caudate and the putamen, collectively called the striatum. Despite their large size and vastly complicated connections, these brain areas "in many ways approximate a random network of interconnecting cells so that considerable divergence and convergence is possible in passage of information from cortical and striatal tissue" (p. 41).

From the study and comparison of the organization of the cerebral cortex and the striatum, neuroscientists have arrived at a "compromise," Miller suggests. On the one hand, cortical organization, particularly in the primary receiving areas, exhibits a striking localization of function. Complementing this, on the other hand, is the action of the association cortex and the striatum which "appear to operate as larger functional units where the single neuron does not, by itself, display responses of strong functional significance for the animal as a whole" (p. 43).

Miller discusses the difficulties surrounding any attempt to meld these two complementary but, nonetheless, contrasting functional organizational patterns. In regard to the striatum, "it seems that unusual principles of organization underlie the function of this terra incognita" (p. 43). The difficulty stems from the widespread distribution of information much akin, says Miller, to that of a holographic device. But on this point he wisely adds the proviso: "The principles of organization of the 'cerebral holograph' will surely be very different from any manmade device" (p. 44).

In one of the most interesting parts of the book, Miller uses his "omniconnection theory" to explain how Gestalts (clusters of associations) are represented within the brain. In order to explore this question, Miller examines the "grandmother hypothesis" or the belief that somewhere in the cortex a single neuron or neuronal network exists possessing all the connections required to recognize "my grandmother."

Obviously, there are difficulties with the grandmother hypothesis even at the linguistic level. For one thing, the word *grandmother* means different things according to usage at particular times. There is grandmother's appearance, her gait, the candy she keeps in her kitchen, the stories she reads to us. Grandmother is each of these, while at the same time she is infinitely more: she is comforting, sometimes short-tempered, and so on. For these reasons alone, it would be unlikely that there could be a cell, or even a cluster of cells, which would totally explain our experience of grandmother. This lack of a "punctate representation" (p. 51) within the brain corresponds very nicely to

the lack of a precise definition of grandmother. This is particularly true in regard to one's memory about grandmother.

"Memory is to a considerable extent a faculty to be considered as a whole, in which all the complex correlations found in the external world are encoded in a fashion which preserves their manifold interrelationships—spatial, temporal, statistical, logical, causal, and so on. The weakness of the 'grandmother' hypothesis is that it allows a classification in representation of information in the brain but does not allow multiple cross-classifications" (p. 51). This difficulty is lessened, Miller assures us, if we assume an "omniconnected network" of neurons functionally related to each other via polysynaptic connections. In this way, the seemingly infinite complexities of grandmother are mirrored by the mind-boggling number of neuronal connections which are possible in the human brain.

While Miller's omniconnection theory makes perfect sense, it is difficult to prove. In addition, it is equally difficult to conceive of an experiment which would disprove it. To this extent, the theory is very much like psychoanalysis: a self-contained, internally consistent system which depends overly much on metaphor and a certain willing suspension of disbelief. For this reason, I believe the omniconnection theory, in common with psychoanalysis, is closer to a philosophy than it is to a science. At various points in the book Miller admits as much: "It is thus the philosophy which underlies the scientific approach to the nervous system" (p. 202). "But it is a sad fact of present day neuroscience that unspoken philosophical differences are often used to set up barriers between the different subdivisions of the subject" (p. 19).

Given Miller's penchant for philosophy, it is surprising and disappointing that he seems unacquainted with the striking similarity between his own ideas and those of American philosopher Charles Sanders Peirce. The "induction" mentioned by Miller throughout the book is often closer to the abduction process of Peirce: the step of advocating a hypothesis or a proposition which would lead to the prediction of what appear to be surprising facts. For instance, Miller tells us of "inductive inference (and with it the capacity for apprehension of meaning and formulation of purpose) is a faculty in which human beings to a greater or lesser extent excel—a faculty displayed to a lower degree by other mammalian species. The products of this faculty are delivered directly to consciousness, and as such determine not so much what we know objectively or can publicly prove but, rather, what we believe and will trust" (p. 9). It would be difficult to compose a better definition of abduction.

I am also concerned that some people may misinterpret such remarks as "In the end the decision as to what we believe must be a personal one, and infallible public demonstration of the correct beliefs' is logically unattainable" (p. 191). I, for one, find this emphasis on "personal decision" more appropriate for religious inquiry than for scientific investigation. Neuroscience is not simply an alternative way of understanding behavior to be contrasted, say, with totemism or psychoanalysis. It is a richer, more penetrating analysis which, with some luck, may even provide some encouragement for the philosopher. In fact, for the neuroscientist and the philosopher, Miller's book should serve as a welcome piece of good news: Don't despair . . . keep looking . . . there really is a cat somewhere in that darkness.

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Liturgies and Trials: The Secularization of Religious Language. By RICHARD K. FENN. New York: Pilgrim Press, 1982. 215 pages. \$15.95. (Oxford: Basil Blackwell, 1982.)

Richard Fenn suggests that liturgies and trials can be seen as paradigms for the sacred and the secular. Analysis of the status of religious language in these polar rituals thus offers the sociologist both a method and data for understanding the process of secularization. From that vantage point, Fenn argues, it is possible to clarify why prophetic language has lost so much of its force in the secular sphere. He supports his thesis by a fascinating analysis of legal and academic transcripts. The resulting interpretation of the secularization of religious language is original, illuminating, and provocative, even though it is not, at least from a theological perspective, entirely satisfactory.

The major part of the book is devoted to explaining and illustrating Fenn's socio-linguistic conception of religion and secularization. Drawing on research in sociology, linguistics, hermeneutics, and biblical studies, he defines religion as "speech that can be relied on" and that is "eventful." He uses the term *secular* to describe more ordinary talk, encountered for example in the courtroom and classroom, where one's meaning is always in question. Secularization names the process through which eventful language loses its power in the rituals of secular institutions. Language is prophetic to the extent that it resists this diminishment of the authority and seriousness of religious discourse.

The "Introduction" and first chapter ("Signs, Symbols, and Social Integration") provide some concrete warrants for this way of speaking. Both liturgy and trial are rituals where testimony is given, guilt and innocence proclaimed, expert and authoritative witness presented, the letter of the law interpreted and its spirit determined. The court, however, "specializes in raising doubts about the trustworthiness, credibility, and authority of serious speech" and of those who give testimony (p. xviii). The trial itself is not immune from later scrutiny or reinterpretation. Liturgy, on the other hand, emphasizes the connections between word, context, and motive, and between speaker and hearer. Liturgies are repeated, but they cannot be appealed or overturned.

Fenn shows that the authority and language of the court is rooted in western religious heritage, particularly in the theme of the last judgment. Despite this, liturgical speech and the language of the court are also fundamentally at odds. Society's integration requires the resolution of conflicts between the corporate beliefs and values of its different communities. Secular institutions like the court and classroom achieve this through rituals which in effect reduce the authority of these various beliefs to matters of personal opinion. On the other hand, religious ritual undermines the authority of secular institutions because it publicly proclaims a higher authority and truth. This conflict is examined in the following chapter, "The Political Dimension of the Liturgy," and in the third chapter, "Religious Testimony on Trial: The Secularization of Witnessing," which analyzes the ways in which the authority and effectiveness of Daniel Berrigan's religious claims were undermined by the procedures in the trial of the Catonsville Nine. Fenn examines analogous conflicts in chapters six ("In the Matter of Karen Ann Quinlan: The Secularization of Religious Testimony") and seven ("In the Matter of Marie Cueto and Raisa Nemikin: The Church's Lost Boundary").

The fourth chapter ("Eventful Speech, Prophecy, and Secularization") and the fifth ("Seminary Talk: Uneventful Speech") elaborate and illustrate Fenn's notion of eventful speech. It is speech that makes something happen. It brings about and re-creates the reality to which it refers. The Mosaic law, for example, "is as forceful centuries later as when first uttered: no less immediate, no less binding, no less disruptive . . ." (p. 93). The analysis of a seminar transcript shows a very different kind of language: detached, academic, and literal—concerned more with creating a text for the record than proclaiming the truth or finding words that would make it effective.

Fenn argues that secularization, ironically, originates in religion itself in the community's efforts to tie down the exact meaning of prophetic speech. "Instead of making the meaning of a message permanent, that meaning takes on the specific interpretation and local references of everyday linguistic usage and so shares the transient nature of everyday life" (p. 173).

Fenn concludes that eventful speech will not easily resist the encroachments of secularization. To do so requires religious rituals that are as authoritative as secular rituals. But, Fenn warns, the effectiveness of liturgical speech is not easily preserved. He sees great peril in liturgical revisions. They "turn liturgies into dispensable objects, but a liturgy, by its very nature, claims that its words will not pass away; they are not part of this passing aeon" (p. 40). He also warns of the difficulties entailed in prophetic efforts to reassert the authority of eventful speech. Because such moves inevitably conflict with the rituals of secular society, the personal cost will be high. Despite these difficulties Fenn offers the final, "highly speculative generalization" that we can expect to see increasing momentum in the prophetic resistance against secularization (p. 197).

Fenn is no doubt aware that sociology could itself be viewed as one of those academic rituals whose methodology puts itself in judgment of religion. His arguments are sensitive to several important religious issues and show familiarity with relevant discussions in biblical studies and hermeneutics. But at least from a theological perspective his definitions of religion and secularity, his understanding of religious discourse, and his assumptions about the relationship between the sacred and secular are still quite reductionist. That irony is perhaps the book's most convincing evidence. Theologians who bristle at Fenn's comfort with so restricted and formal a definition of religion, at the ease with which he seems to identify the sacred with liturgical tests, the penultimate eucharist with the eschaton, and the Incarnate Word with the words of the liturgy, will certainly be inclined to heed his warnings about the power of secular rituals to undermine the religious testimony.

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The Compromised Scientist: William James in the Development of American Psychology.
By DANIEL W. BJORK. New York: Columbia University Press, 1983. 221 pages.
\$32.50.

American psychological science, Daniel W. Bjork contends, emerged as a compromise between two intellectual styles competing for the allegiance of late nineteenth-century intellectuals: scientific positivism and Protestant moralism. Bjork explores the nature of this compromise by focusing upon the successive stages in William James's personal and professional development. James lends himself to this study because he was clearly more than a founding father of American experimental psychology; he was a living symbol of the scientific spirit, of the university, and of the age. Chronologically, his life spanned a period in which a fledgling republic whose western territories were still claimed by Mexico transformed itself into a nation poised to save the world for democracy. Intellectually, James participated in the gradual shift of American thought from the genteel transcendentalism of Ralph Waldo Emerson to the pragmatic instrumentalism of John Dewey. It was thus inevitable that the field of psychology which James helped pioneer would register the conflict between the demands posed by America's cultural past and the distinctively modern spirit of scientific positivism. In James at least, a compromise was struck which gave early American psychology a precarious professional identity.

Bjork's thesis concerning the compromised character of early American psychology builds upon his own psychobiographical interpretation of the compromises forced upon James in the course of his personal development. Unlike many interpretations of James's life which contend that his years pursuing scientific psychology were but a circuitous detour toward the emergence of his "buried" philosophical interests, Bjork argues that James was first and always an artist. Through a careful analysis of James's diary entries and correspondence in the late 1860s, Bjork convincingly demonstrates that James's abandonment of a career in painting coincided with a "creative illness" which could only be resolved by shifting his artistic aspirations into new fields of activity. The compromise which James effected in his own life eventually manifested itself in the unique psychological vocabulary of the stream of consciousness. James's artistic sensibilities were thus transmuted into psychological discourse.

Bjork's contention that James's psychological perspective took shape amidst a personal crisis in the late 1860s—and not in an experimental laboratory—is well taken. Unfortunately, he is never sufficiently clear as to why a personal compromise between a vocation in either art or science can be directly equated with the difficulties which the first generation of American psychologists faced when mediating between science and the demands of American culture. Of interest is the fact that William Clebsch has already attempted to do this in his *American Religious Thought* (Chicago: Univ. of Chicago Press, 1973). Clebsch, whom Bjork fails to cite, deftly links James's aesthetic sensibility with an enduring strain of American intellectual thought shared, among others, by Jonathan Edwards, Emerson, and the American followers of Emanuel Swedenborg. The value of Clebsch's study is that it reveals precisely how James's "scientific" exploration of the boundaries of human consciousness was at once peculiarly American and peculiarly religious. Bjork, however, offers neither a compelling psychological argument nor a developed intellectual

history with which we might identify the specific personal and cultural meanings embodied in James's writings. For example, he misses the important sense in which James's psychology of the subliminal self was a structural replay of his father's Swedenborgianism and the reason why F. W. Myers would inform his "scientific" position more than any academic colleague. But although the point is somewhat weakly developed, Bjork is certainly correct in claiming that James's foray into science was from the outset guided by an aesthetic attitude which refused to limit the natural universe to the categories of scientific positivism.

The middle chapters of the book further Bjork's thesis by exploring the psychological systems of three uncompromised American psychologists—Hugo Munsterberg, Edward B. Titchener, and James McKeen Cattell. Each serves as a foil to James in terms of unqualified endorsement of tough-minded scientific method. Bjork notes that, in contrast to James's literary functionalism, "they had psychological systems; their respective psychologies carried a dogmatic security, an uncompromised consistency, an impersonal objectivity that his lacked" (p. 84). Cattell, for example, pioneered the use of quantitative analysis and helped open up the field of applied psychology. Cattell was, in this sense, "more scientifically American because he had no great, expansive, culturally authentic vision to defend. Thus, he would be remembered in the history of American science but largely forgotten in American cultural history" (p. 123).

The seventh chapter ("Accommodating the Boundaries of Consciousness") culminates Bjork's argument concerning the compromised character of James's psychology. Noting that James was the only first-generation American experimental psychologist to incorporate the concept of the unconscious into his psychology, Bjork contends that in doing so he revealed himself not as a harbinger of twentieth-century scientific method but rather as an artist who had years before been forced to seek a new vehicle for creative expression. "His journey into the unconscious suggested a continuing search for the relationship between his psychology and his identity" (p. 147). The creative tension between art and science in James's life not only made the unconscious a natural medium through which he might project his own ambivalences, but in turn it helped him to symbolize the tensions of his age. The "American unconscious" as formulated by James enabled Americans to accommodate to the emerging forms of modern thought while yet defending their personal identities and religious convictions against the onslaughts of psychological reductionism.

This volume is well written and weaves James's personal and professional writings together in such a way as to provide important insight into the ideological character of American social science. As such it is a helpful companion to such fine studies as Mary O. Furner's *Advocacy and Objectivity: A Crisis in the Professionalization of American Social Science, 1865-1905* (Lexington: Univ. of Kentucky Press, 1975) and Dorothy Ross's *G. Stanley Hall: The Psychologist as Prophet* (Chicago: Univ. of Chicago Press, 1972). Bjork is surely correct, though hardly original, in asserting that James's science and his Americanism often pushed in opposing directions. It is also true that it was James's attempt to mediate between the two that gave his psychology the symbolic character of sustaining "the American conviction that science, the self, and moral decisions are intertwined, never fundamentally opposed" (p. 173).

What remains problematic in this study, however, is Bjork's unquestioning acceptance of the fact that "science went its way and James went his" (p. 173).

He seems content to pronounce that "James has very little to say to professional psychologists now" (p. 168). Nothing, of course, could be further from the truth as has been forcefully argued by Don Browning in his *Pluralism and Personality: William James and Some Contemporary Cultures of Psychology* (Lewisburg, Pa.: Bucknell Univ. Press, 1980) and William Barrett in his *The Illusion of Technique* (Garden City, N. Y.: Anchor Press, 1978). It is in this regard that it is so unfortunate that Bjork never explores what James's literary functionalism really consisted of, much less assesses its relative merits as a philosophical framework for constructing psychological models of human behavior. Nor, for that matter, does he ever discuss whether the phenomenological character of James's psychology is to be considered a mark of compromised or uncompromised science. Finally, if it is true that psychology has moved beyond James in its uncompromising adherence to objective experimentalism and applied technique, is it not equally true that in the process it has lost the theoretical resources for making meaningful distinctions between empirical and normative assessments of human nature?

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Through a Darkening Glass: Philosophy, Literature and Cultural Change. By D. Z. PHILLIPS. Notre Dame, Ind.: University of Notre Dame Press, 1982. 196 pages. \$16.95.

Through a Darkening Glass is a book fashioned out of nine disparate essays, published and unpublished, chiefly concerned with ethics and morality. For example, the first essay, "Allegiance and Change in Morality: A Study of Contrasts" (chapter 2), deals with the problem of how our moral values change and how philosophy, because of an abstracted concept of reasonableness, distorts our understanding of the problem. Phillips insists that we must eschew the goal of a general answer here and simply come to recognize that old values die and new ones take their place; that there just are "different conceptions of what is important in life" (p. 25). Similarly, "Some Hints to Moral Endeavor" (chapter 3) is an attack on abstract theories in ethics. Such theories, he attempts to show, are too neat and tidy and therefore fail to reveal the real character of moral decision-making that is quite apparent in actual life situations involving moral dilemmas, ambiguous situations, limitations of character in contexts calling for a moral decision, and so on. A critical review of Logan Speirs's critique of Leo Tolstoy's and Anton Chekhov's views of the meaning of death is presented in "Moral Presuppositions and Literary Criticism" (chapter 4). "Philosophizing and Reading a Story" (chapter 5) follows the same theme with an analysis of Tolstoy's *The Death of Ivan Ilych*.

Chapter 6 on Sigmund Freud and the oedipus complex seems somewhat out of character in this collection. The last four chapters concern matters that are more religious than ethical. "Knowledge, Patience and Faust" (chapter 7) and "Meaning, Memory and Longing" (chapter 8) deal with the notions of "committing one's future to God" and "waiting on God." "Ingmar Bergman's Re-

ductionism" (chapter 9) assesses Bergman's reductionistic view of religion through an analysis of his trilogy of films: "Through a Glass Darkly," "Winter Light," and "The Silence." A final chapter (10), "Seeking the Poem in the Pain" is a moving examination of the poetry of R. S. Thomas.

From this account it might well seem that Phillips's only, or at least chief, concerns are ethics and religion. In terms of the essays themselves, taken individually, this is a fair description, but as elements of the book it seems to me that a more pressing concern is what we might refer to as the education of philosophy by literature. This message is particularly clear in chapters 2, 5, and 7 in which Phillips insists that philosophers must wait on the novel, wait on the story, and wait on the works of literature. The repeated references, in these and other essays, to the limitations of abstract philosophy reiterate the same theme. Only in giving up the desire to explain—the desire for tidiness and simplicity in the analysis of human affairs—can "literature help to deliver us from misperceiving the human situation." To "wait on the works of literature" in this fashion, he insists, is to heed the wisdom of Ludwig Wittgenstein's command "Don't think. Look!" (p. 90).

This dual focus of the volume is, however, quite conscious as the introduction to the essays reveals. Phillips tells us directly that he is concerned mainly with two themes: that of moral and cultural change and how to understand it—lost meanings that were once available but no longer, so constituting a darkening mirror—and that of the limitations inherent in our attempts to understand such losses philosophically—such distortions as the limitations of philosophy create also constituting a darkening mirror. The latter theme is certainly not new to Phillips's work and is not likely to be any more palatable in this form than it was when delivered more directly in his earlier work. The exact nature of his own writing in this volume is, in fact, suspect because it seems to fall between philosophy and literature—it is neither and yet both at the same time. A review, however, is not the place to undertake a critique of that thesis or any other.

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Mechanistic and Nonmechanistic Science: An Investigation Into the Nature of Consciousness and Form. By RICHARD L. THOMPSON. Lynbrook, N. Y.: Bala Books, 1981. 254 pages. \$6.95 (paper).

Richard L. Thompson, known also as Sadāpūta Dāsa, has written a clear apology for the religious philosophy of the Hare Krishna movement from the perspective of a scientist and mathematician. His method is to show that the common mechanistic and reductionistic paradigms of science contain serious instabilities and internal contradictions and cannot therefore really explain what we know about the external world and human consciousness. He maintains that through the nonmechanistic though verifiable process of *bhakti-yoga* we can make sense of ourselves and our place in the world in strict compatibility with modern science.

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The attractive quality of this book is that Thompson writes as a scientist about science with a clarity, accuracy, and objectivity that should engender respect both from scientists and from those whose religious persuasions are other than his own. He presents the philosophical instabilities of contemporary scientific theory in a clear scientific language without a recourse to *ad hoc* religious explanations. He could have written a shorter book that showed "on the basis of logic and ordinary evidence that the prevailing theories of physics and biology have serious defects which can be traced to shortcomings in their underlying mechanistic framework" (p. 4), and then let the religious scholar ponder the adequacies of his or her larger perspective for a comprehensive framework for scientific explanation. He chose instead, to show how one such perspective can act as an explanation without claiming that logic or evidence necessarily drives one to accept just this perspective. Scientists reading the book need not feel betrayed by Thompson, for he shows throughout both a respect and love for good science. Because he loves science, he is pained by its contradictions and seeks its intelligibility in a larger context.

Although Thompson asserts that the dominant viewpoint among scientists is mechanism and uses this word in the title of his book, he really does not describe a traditional mechanism, or even a modern one, as built on some image of a machine. Instead he characterizes a viewpoint as held by scientists, and particular physicists, that has evolved out of, but no longer is, the traditional mechanism. According to Thompson this contemporary philosophy of mechanism has two features: first, matter can be represented by numbers that correspond directly or indirectly to experimentally measureable properties, and second, the behavior of matter can be described by mathematical expressions called "laws of nature" (p. 1). Notice that these features could be held by many current nonmechanistic philosophies, including that of Thompson himself. It is true, of course, that these features assume mechanistic overtones in the dominant scientific philosophy. However, it is not a pure mechanism but a reductionism that Thompson is speaking against, namely, that matter as interpreted by the laws of nature is a *sufficient* explanation of existence.

Although I shall continue to use Thompson's term *mechanism* in this review, what is really meant by this word is the philosophy expressed by the two characteristics above and a third characteristic of mechanism used throughout the book but not explicitly mentioned in the Introduction. It is that "the phenomena of nature derive in a harmonious way from some ultimate, unified source" (p. 144). For an actual philosophy of mechanism, this source would be matter. For contemporary scientific philosophies, even those that Thompson calls mechanistic, it need not be matter. However, this unified source does insure the belief that the laws of nature are simple and comprehensible.

Thompson shows by numerous well-developed examples that this contemporary understanding of mechanism cannot account for actual current scientific explanation. I shall describe briefly a few of the examples that I consider most telling: first, an argument from information theory that is used in a number of important places in the book; second, an argument from computer science; and third, an example and argument based on communications engineering. I have chosen these examples not only for their significance but because they are probably new to many readers. In the examples and arguments below I have radically simplified Thompson's more complete presentation, which is required in order to do the arguments full justice.

First, an argument from information theory begins by stating that the laws of nature as presently understood by physical scientists can be expressed com-

pactly by a few mathematical expressions and therefore have a low information content. An existing complex form with high information content cannot be explained in completeness by an information system with low information content. Living organisms possess high information content. Therefore, they cannot be explained by the currently understood laws of nature.

Thompson argues in great detail and with considerable mathematical sophistication that life could not arise through the action of natural laws alone and in particular through the mechanism of natural selection. He does not discount the power of natural selection or in any way disparage the success of explanation by natural laws. However, natural laws, according to Thompson, cannot by themselves account for the existence of complex living forms.

One way to remedy this failure of a natural law explanation of life would be to increase the information content of the laws to allow an adequate explanation. But this would mean that they would lose their simplicity and become so complicated as to force us to conclude that the universe they model is "an incomprehensible welter of arbitrary complexities" (p. 98). A more promising approach would be to consider that life itself, and an intelligent life in particular which is not ultimately and completely characterizable by mathematical laws, is the primary cause of the universe.

Second, the argument from computer science maintains that computers cannot have actual conscious experience, but that we humans do have actual conscious experience. A mechanistic perspective entails viewing the human organism as a type of computer. Therefore scientific mechanism cannot explain conscious experience. We need a nonmechanistic approach to human existence.

Thompson does a nice job in showing why a computer cannot have conscious experience. His discussion involves describing the essential parts and operation of a digital computer, showing that at no time does the computer do other than operate on simple data according to simple instructions, and that these simple operations never involve the real phenomenon of consciousness. By invoking Alonzo Church's thesis, he shows that any well-defined procedure, no matter how complex, can be performed by some digital computer. If the phenomenon of consciousness is assumed to be representable by a (very complex) well-defined procedure it could be programmed into a digital computer. Although the computer might have some abstract consciousness in this case, it could not have an actual consciousness since the well-defined procedure is made up of elementary subroutines none of which have any possible trace of actual consciousness.

I think that Thompson's conclusion that we need a nonmechanistic approach to human existence is true, and that his argument is valid in all its parts provided that one assumes that a computer really cannot have conscious experience. I hold that any actual event (and especially an event of consciousness) can never be represented completely by any mathematical description or well defined procedure. But this does not mean that we ultimately cannot build a machine out of real components, none of which can be described completely by mathematics, that is intelligent and possibly conscious. It does mean that we could never use mechanistic science to describe adequately what we have done. Douglas R. Hofstadter's book, *Godel, Escher, Bach: An Eternal Golden Braid* (New York: Basic Books, 1979) shows how it may be possible to build a computer with intelligence, and possibly consciousness, but he recognizes that the question of whether we can actually create genuine artificial intelligence is unanswerable at this time. Thompson does not seem to be familiar with Hofstadter's work, and therefore does not respond to issues that he raises.

Third, using communications engineering Thompson presents the following example. Any message has an information content that can be expressed as a sequence of ones and zeros. Such messages may be compressed to a minimal length with a maximum information density without losing the content of the message. When so compressed, however, the message appears to be completely random, that is, all patterns of ones and zeros occur with roughly the same frequency. With this example, Thompson then develops an argument about absolute chance. Current explanations of the phenomena of physics have their foundation in quantum mechanics. In quantum mechanics almost all events involve "quantum jumps" that occur randomly. This randomness is thought to occur because of an absolute or causeless chance. Causeless chance has become a fundamental principle of explanation in modern physical as well as biological science. From the example above we may conclude that "it is not justifiable to insist upon absolute chance as an explanation of apparent randomness in nature" (p. 152). Such randomness, like the compressed message, may include a large amount of significant, but uninterpreted, information.

Thompson uses this argument in a very satisfying way to challenge the function of the concept of absolute chance that he believes has become so important along with the concept of natural selection in the theory of evolution. Thompson affirms and argues that there is a universal conscious being, a Supreme Person, who does allow us to understand the present apparently random but really uninterpreted scientific information through a non-mechanistic philosophy of *bhakti-yoga*.

On balance, I think this book is a very valuable addition to the current literature in science and religion. Thompson's choice of examples from science that seem to upset contemporary scientific paradigms is superb. They are all relevant. They are carefully explained and in one book. Many come from quite recent developments (including the punctuated equilibrium model of evolution by Niles Eldredge and Stephen Jay Gould) which I have not outlined in this review. These examples form test cases that must be applied to any philosophy of religion that claims adequacy to represent science. The process theologian or Thomist, for example, can examine how process philosophy or Thomism can handle the puzzles and anomalies arising in science that seem to discredit current scientific explanation, as well as compare the success of such philosophies with one derived from the *Bhagavad-gītā*.

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Religion, Revelation and Reason. By ERIC RUST. Macon, Ga.: Mercer University Press, 1981. 186 pages. \$14.50.

The apparent catalyst for Eric Rust's *Religion, Revelation and Reason* is the current scientific milieu which has made religious faith increasingly difficult. The dilemma of faith is this: "In our time, the scientific atmosphere has made it still more difficult to justify religious experience, not because science is antithetical to religion, but because the increasing success of science has con-

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firmed for many the belief that sense experience is the only way of knowing" (p. 30).

For Rust science becomes a comprehensive term which includes something more than the natural sciences. He reserves *science* for reference to that "ordered reasoning" which ferrets out the truth about some particular experience. Reason after all is what makes humanity human. In the ability to reason the human creature differs ultimately and finally from the creatures of the animal order. Thus reason lies not only at the heart of science as science seeks to order and classify the various aspects of sensory experience; it ought to have to do no less with religious faith and, one would presume, any activity that is distinctly human. What Rust seeks to do is to bring this most distinctive characteristic of humanity to bear on faith and to develop a religious philosophy adequate to face the crisis in which faith now finds itself.

One nevertheless is compelled to wonder as the argument develops whether the distinguishing mark of humanity is indeed reason or the propensity to faith, or at least to raise questions of religious significance. Rust himself recognizes that elementary expressions of thinking, and therefore some ability to reason, are to be found in the higher animals. One suspects then that what ultimately sets the human creature apart is not capacity for reason so much as capacity for questions of meaning and value, for that reflective thinking which wonders about the beautiful, the good, and perhaps even the gods. It is true, however, that we are at our best when we bring reason to bear on this uniquely human quest for answers to questions with ethical and religious import. Rust rightly sees that it is essential if religious faith is to enjoy credibility in an age of science.

The solution to the dilemma of faith has to do not so much with conflict between religion and science but, according to Rust, with understanding the legitimate claims of each. The popular fallacy is that science intimidates religion, forcing it to retreat farther and farther from where modern life really is lived. Such is not the case where both are properly understood. The fact is that experimental science or cold reasoning cannot say *yea* or *no* concerning the deepest, most felt claims of faith. The reasoning of science seeks to know the laws and facts of the universe; it seeks to identify, classify, and list observed phenomena. In contrast, the reasoning in religion is concerned predominantly with discerning a pattern in the facts which science may observe. This is not just any pattern but one which reveals what Rust designates the "transcendent Presence." Hence his predisposition to theism. He goes on to say, "Religion is a response to such a pattern, and religious language is concerned to direct attention to this pattern in facts, facts with which others are familiar" (p. 39).

It then follows that revelation constitutes the disclosure of the transcendent Presence through events of nature and history which become patterning events. Where events taken together point to the divine Presence, there one can speak meaningfully of revelation. Rust's understanding of revelation is thoroughly Tillichian. "A revelation occurs," he concludes, "when some thing, some person, some historical event takes on a miraculous quality and points beyond itself to the Transcendent Presence" (p. 53). Almost any aspect of our sensory world, whether of nature or history, can become a medium for revelation. Those media possess no divine or revelatory significance in themselves; they enjoy no special status and remain as subject to the limits and laws of nature as nonrevelatory objects. It is true that the media of revelation may vary widely with respect to degree and quality. Rust concludes that persons and events of history innately provide better potential as media than the things or

processes of nature. Any other conclusion by one so steeped in Judeo-Christianity should be surprising. The significant difference between ancient Hebrew and Christian faith and their counterparts, which were the nature and mystery religions, lay in the fact that history and human self-awareness become the ultimate realm of God's activity in the former while nature becomes such in the latter. Yahweh was Lord of the sea across which He led Israel on dry ground, but where He manifested His sovereignty most clearly was at Sinai and in the wilderness in the consciousness and yearnings of a people. Historical events provide much more important revelatory media than nature in Judeo-Christianity in particular and Western theism in general.

Reason seeks usually to establish logically the existence of that ultimate being that is disclosed in revelation, but that is a fallacious endeavor according to Rust. One cannot establish an acceptable theistic position by reason alone. Moreover, the classical logical proofs for the existence of God, which Rust examines in detail, finally are unsatisfying because they lack logical validity. They are convincing only to one who already believes. Belief in God does not and cannot depend on proof; rather, faith is a matter of insight for which revelation is the vehicle. The legitimate function of reason is to confirm the insight which revelation brings. "The analytical reason," says Rust "proceeds to develop and make intelligible that pattern in reality which the synthetic reason or intuitive insight has grasped" (p. 99). This then is Anselm's "faith seeking understanding." The cognitive insights of faith must be explored and that which is implicit made explicit. What is axiomatic for Rust is the precedence of faith; reason alone accomplishes nothing for religion. Reason properly used explains, orders, and makes intelligent the content of insight and revelation already given.

The latter chapters of the book are given over to examining more specific issues relating to a theistic philosophy, namely, the place of scientific knowledge, the nature and destiny of man, and the challenge to theistic thinking of the problem of evil. While those are theological issues or at least of interest to theology, Rust claims no attempt at theology; instead, his overall concern lies with religious philosophy which is broadly compatible with Western theism and lends support to it.

The mood of the book finally is that of Christian apology. His intention is to address above all a skeptical generation that lacks confidence in what faith can discern. His approach is to make religion and revelation respectable by bathing them in reason, that being more convincing to children of science. This makes his book a kind of prolegomena to Christian theology in a scientific age. While it is not itself an exercise in theology, it does function as a handbook for those who would move from a positive valuation of the scientific milieu to an equally positive valuation of religious faith and vice versa.

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