

WILLARD A. YOUNG. *Fallacies of Creationism*. Calgary, AB: Detselig Enterprises Limited 1985. Pp. 302. Cdn\$21.95. ISBN 0-920490-53-0.

No matter what one thinks of scientific creationism, it has certainly put some of the 'old verve' into the discussions of origins. Although most philosophers interested in such issues would tend to agree that such discussions have been and are being carried on in a much more fruitful manner by others than the proponents of scientific creationism, and that it is too bad that so much time has to be wasted fighting old and fruitless battles, nevertheless, I think that scientific creationism at least provides us with the occasion to think through again and present in an intelligible fashion many issues of philosophical significance. We are reminded both that enough progress has been made on some of these issues so as to make scientific creationism an implausible position, and that such fundamental issues as the nature of science, religion and morality and their interrelationships are far from being settled.

Willard Young, a Canadian physicist and researcher, has taken on the scientific creationists in this clearly written volume, and although both philosophers of science and of religion will, I believe, find this work lacking in the kind of philosophical sophistication about science and religion they rightly admire and promote, other aspects of Young's work should prove helpful to both philosophers and theologians.

Young divides his work into three parts. In the first part, he provides a brief sketch of the historical factors leading to religious fundamentalism in the United States. He also gives a detailed and informative survey of creationist institutions and proponents in Canada and the United States, as well as an outline of some of their efforts to promote creationism in the classroom by influencing text-book selection and their attempts by legislative means to have scientific creationism given 'equal time' with evolutionary theory in science classes in the public schools. In addition, Young traces, in the creationist literature, some of their profound misgivings about what they consider to be the very negative moral and political consequences of the materialistic philosophy of evolutionism. For those unacquainted with creationist views and activities, the first part is an informative introduction both to a movement that may seem startling, frightening and repugnant and to views about science, religion, morality and how they have been and ought to be related, which may appear to be very wrong. Young provides some of the factual material, but neither the philosophical nor theological analyses, needed to address these challenges of scientific creationism.

Part Two, the briefest, only some twenty-four pages, is a too short history of the development of Darwinian evolutionary theory. Most philosophers will know most of the history presented. For laypersons, it will be helpful but more would have been better. Surprisingly, Young does not say very much about the *content* of Darwin's theory.

In Part Three, Young comes to the scientific heart of the matter. What is creation science? What is evolutionary theory? What support is there for each?

What are the creationists' scientific objections to evolutionary theory, and how good are they?

Young devotes chapters to the nature of current evolutionary theory and to theories of the origin of life. The latter is a mini-course in biochemistry and molecular biology for beginners. He shows that creationists' attempts to use the second law of thermodynamics to prove the impossibility of evolution are utterly unsound and that their application of probability theory to demonstrate the extreme unlikelihood of the emergence of living forms from non-living materials is naive and biologically uninformed. He also makes clear that creationist attacks on both the fossil evidence for evolution and the methods of determining the age of the earth and the universe have no merit. Young concludes with a brief survey of the paleontological and anthropological evidence for the evolutionary origins of the human species.

Young is seeking to convince the educated layperson who might be fooled by all its scientific trappings that underneath scientific creationism lies fundamentalist religion. He is reasonably successful in this endeavour. Scientists, however, will probably neither learn much new science nor find the kinds of clarification of the nature of science and religion that can be brought to bear on the former by a philosopher of science and on the latter by either philosopher of religion or theologian. Philosophers and theologians, on the other hand, may learn some science but be dissatisfied with Young's discussions of science and religion. On those scores, I recommend strongly Philip Kitcher's *Abusing Science: The Case Against Creationism*, for a brilliant summary of a current philosophical view of the nature of science. Ian Barbour's *Issues in Science and Religion*, though covering much more than the issues of creation and evolution, remains, in my mind, the best current religiously sophisticated discussion of that issue. Yet, one shouldn't expect everything from one volume. Young's work is part of what must be an interdisciplinary effort to seek the truth as best we can about origins.

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## Roger Sperry's Science of Values

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Though much attention has been paid to E.O. Wilson's views about "biologizing" ethics and some attention has been paid to B.F. Skinner's claim that the science of operant behavior is the science of values, less philosophical attention has been paid to the proposals for a science of ethics and values by Nobel laureate Roger Sperry. While rejecting both behaviorism and sociobiology, Sperry argues for a science of values built on his thesis of emergent mentalism, a thesis that itself has, Sperry believes, respectable scientific support. I examine Sperry's proposal and argue, first, that his proposal enables him to overcome the fatal objections to reductionistic sociobiological and behavioral attempts to make ethics scientific and that eliminate a role for cognition in human behavior. Nevertheless, both as a genealogy of morals and ethical behavior and as a metaethical justification of values and ethical principles, Sperry's thesis can do with some help from both non-reductionistic cognitive behavioral psychology and sociobiology. Second, I contend that even with this assistance it needs further support from naturalistic principles about the relationships between fact and value. More specifically, Sperry's causal thesis about the role of values in effecting behavior requires supplementing with the teleological explanations used in sociobiology and behaviorism. Moreover, his attempts to bridge the fact/value dichotomy need to be fortified with a naturalistic assumption that human values are to be identified with what fulfills human capacities.

B.F. Skinner (1971, p. 99) tells us that the science of operant behavior is the science of values. E.O. Wilson (1975, 1978) maintains that ethics must be temporarily taken out of the hands of moral philosophers and biologized. Moral philosophers have not cared too much about either of these suggestions to make ethics scientific (Flanagan, 1984; Fulmer, 1976; Kitcher, 1985; Singer, 1981).

Moral philosophers offer at least two fundamental critiques of such proposals. First they charge that behaviorist and sociobiological explanations cannot adequately account for ethical behavior and principles because they reductively eliminate the cognitive and intentional activity that is the source of such behavior. In addition, these critics contend that no causal account of the origin, development and maintenance of value systems can provide a justification for ethical behaviors and their founding principles and values—

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such accounts are flawed both as a genealogy and as a justification of morals. And a major source of their inadequacy is their failure to give proper attention to human cognitive capacities.

Over the course of the last two decades, Nobel laureate neuro-scientist Roger Sperry (1983) has developed another proposal for a science of values based on his theory of emergent mentalism that seems to meet squarely the alleged inadequacies of behaviorist and sociobiological accounts. While rejecting both behaviorism and sociobiology, Sperry argues for a scientific account of values built on recent scientific studies, in particular those in the neurosciences, which show that cognitions, particularly values, play an important role in human behavior. Sperry rejects the reductionistic elimination of the mental and argues that we can look forward to an increasing scientific understanding of the role of values in the production and justification of ethical behavior. Science has a role in providing both the genealogy and justification of values.

In this paper I shall examine Sperry's contention. I shall argue that although as a genealogy of morals, Sperry's emergent mentalism fills a major lacuna in reductionistic behaviorist and sociobiological proposals, it need not reject all behaviorist and sociobiological claims for a science of values. Sperry's own cognitive account, I shall argue, can be integrated with non-reductionistic sociobiological and behaviorist understandings of the origin, development and maintenance of values. Secondly, I shall argue that even with this additional support from sociobiological and behaviorist perspectives, Sperry's science of values, as a metaethical justification of values, cannot do without some help from naturalistic principles concerning the relationships between fact and value. My aim in making this second point is the limited one of fitting Sperry's proposal into the larger context of a scientifically based naturalistic metaethical justification of values. Although this approach to metaethical justification is, to say the least, controversial, it has been supported recently in a variety of different ways (Richards, 1986a, 1986b; Rottschaefer, 1984; Rottschaefer and Martinsen, 1984; Ruse, 1986, pp. 67-102; 207-272).

I shall first present Sperry's proposal for a scientific ethics. Then I shall assess his attempt to provide a scientifically based genealogy of morals. Lastly, I shall evaluate his proposal for justifying scientifically based value claims.

### Sperry's Proposal

Sperry contends that the cognitive revolution which has swept psychology in the past two decades or so has also found support in the neurosciences. Indeed, he argues that the neurosciences are the vanguard of this revolution (1986a). Thus, he claims that there is a legitimate role for the mental in explaining human behavior. Sperry (1969, 1980, 1983) calls his position emergent

mentalism and distinguishes it from both dualism and materialism. He claims to escape dualism because he considers the mental to be a holistic property of the brain and he contends that his position avoids materialism, in particular the mind-brain identity thesis, because the mental, he believes, is an emergent property of the brain distinguishable from its neurophysiological subsystems and their properties of which the brain is composed. Consequently, unlike behaviorists and reductionists, Sperry believes that the mental plays a causal role in human behavior and as a result it is neither a mere epiphenomenon of the brain nor identical with it. As such it is an ineliminable factor in accounting for human behavior. Partial and indirect support for the thesis of emergent mentalism comes, Sperry believes, from work in the neurosciences, particularly from his own split-brain research. In addition, Sperry looks to the cognitive revolution in psychology generally to support his position. And he believes that his emergent mentalist view is plausible both because it provides a reason why mind has evolved in nature and because it fits with a non-reductionistic, levels approach to reality which he believes is developing in the sciences generally (Ripley, 1984; Rottschaefer, 1984).

Sperry's proposal for a science of values rests squarely on his emergent mentalism. For, in Sperry's view, ethical activity and evaluation is in its fullest form cognitively based. In developing his proposal about values, Sperry (1983, pp. 16ff; 109-112) adds to his position of emergent mentalism five theses concerning the nature and function of values: (1) values are both cognitive and noncognitive. The former arise from our cognitive interaction with the world and show great social and cultural diversity. The latter arise from our biological and psychological natures and are to some degree genetically based. These show great commonality throughout different cultures and societies. (2) Cognitive values are a subset of ideas. (3) As such they are the major determinants of human behavior. (4) Cognitive values are hierarchically organized in such a way that the highest values, the ones which concern a person's most general assessment of the meaning of life, are determinative of lower level cognitive values. These in turn guide the acquisition of learned non-cognitive values. (5) Long range, satisfactory solutions to our ethical problems will come by changing our highest values rather than by unplanned, piecemeal social adaptation.

Sperry's proposal for a science of ethics falls within the camp of ethical naturalism since it implies that our ethical life, beliefs, principles and justifications are best understood in terms of the facts about ourselves and the world. The proposal is a scientific naturalism insofar as it claims that the sciences, as our most successful means for finding out about ourselves and the world, should be employed both substantively and methodologically for understanding and justifying our ethical practices and beliefs. More specifically, there are three ways in which ethics and value theory become scientific ac-

According to Sperry (1983, pp. 62-76): (1) the sciences, specifically what Sperry calls the behavioral sciences, that is, biology, psychology, and the social sciences, provide a causal account of the origin, development, and maintenance of values as well as of the role that values play in effecting human behavior. (2) The sciences provide the fundamental world view that informs substantive ethical first principles and metaethical justifications. (3) Both the fundamental worldview and the causal account derive from the application of scientific methodology. Sperry, then, is suggesting that the sciences, by providing a genealogy of morals and showing how ethical claims can be justified, have contributions to make to both descriptive and metaethical issues.

### A Genealogy of Morals

Sperry's theses on emergent mentalism, cognitive and non-cognitive values, and the hierarchic ordering of values all make claims relevant to a genealogy of morals. I shall focus on the latter two sets of theses, although I should say something first about the status of his central thesis of emergent mentalism.

As might be expected, Sperry's emergent mentalism is not an uncontroversial one. Two major issues have arisen in recent discussions of it, the first concerning its precise import and the second concerning its justification (Bunge, 1980; Churchland, 1986; Ripley, 1984; Wimsatt, 1976). Sperry's claim to avoid both dualism and materialism has caused some perplexity since, excepting monistic mentalism, dualism and materialism are usually taken to be antithetical and exhaustive positions. However, in a penetrating exposition of Sperry's account of consciousness, Ripley (1984) has, I believe, demonstrated that Sperry's denial of materialism does not force him into dualism. Ripley argues that Sperry's emergent mentalism can be best understood as a denial of *physicalistic* materialism, the view that reduces consciousness to the physio-chemical activities of the brain's subsystems. But, on Sperry's view, since consciousness is a function and property of the brain as a whole, Sperry's position is non-dualistic. And by the very fact that consciousness is a property of the brain open to scientific investigation, it is material. Consequently, we must distinguish Sperry's view from the dualist thesis of his fellow neuroscientist John Eccles (Popper and Eccles, 1977). The difficulties in understanding how Sperry avoids dualism seem to be increased by his own characterization of his position as an interactionist one in which consciousness and brain are causally interactive. Such a description of his position can make it appear to be at least implicitly dualistic since the usual conception of causality often implies some kind of entitative distinction between cause and effect. But as Ripley (1984) has pointed out, using Bunge's analysis of causality (1963), Sperry's account of the causality of ideas does not

involve the action of two independent entities upon each other. Rather, it concerns the way a whole is determinative of the activity of its parts. One of Sperry's favorite examples of this kind of causality is the way a rolling wheel determines the position and velocity of the molecules and atoms of which it is composed. Sperry's hypothesis is that the systematic properties of the brain as a whole are determinative in part of the activities of the neuronal elements of which it is composed.

But besides the perplexities about the exact nature of Sperry's mentalism there are challenges to the non-reductive causal role that it assigns to the mental (Bunge, 1980; Churchland, 1986; Klee, 1984; Sperry, 1986b). Sperry has argued that his work, especially the split-brain research, indicates that holistic properties of the brain influence behavior. He also contends that his work supports the common sense view that what we experientially identify as sensations, perceptions, thoughts, ideas, feelings and so forth are causally influential in our behaviors. Although Sperry is not completely consistent about the relationships between common sense mentalism and emergent mentalism (Ripley, 1984; Rottschaefer, 1984), it seems reasonable to interpret him as claiming that the experientially characterized mental sources of behavior are to be identified with the wholistic properties of the brain that Sperry postulates in his thesis on emergent mentalism. If so, then one can argue that Sperry's mentalist position gains support, relative to both behaviorist and neurophysiological reductionist positions, from recent advances in both cognitive (Gardener, 1985) and cognitive behavioral psychology (Bandura, 1986; Erwin, 1979). What remains, among other things, as a point of contention within the cognitivist camp is the type of cognitivism that will prove most successful in capturing the nature of the mental, whether it be Sperry's non-reductive neurophysiological mentalism, information processing models of cognitive psychology, common sense mentalism or some combination of the three (Rottschaefer, 1985). But given the internal support for emergent mentalism from the work of Sperry and his collaborators and the external support for cognitivism is psychology generally, there seems to be enough warrant to view Sperry's emergent mentalism as a viable research program worth further pursuit (Sperry, 1986b). Granting it this status, it seems to me valuable to explore how the thesis of mental emergentism gets worked out when it is applied to those ideas that Sperry calls values.

Sperry rejects both behaviorist and sociobiological accounts of human behavior generally and of ethical behavior specifically, especially since he believes that they disregard the role of cognition. We can, I believe, grant to Sperry that the behaviorist program as an attempt to provide a complete account of human behavior without recourse to the mental has either failed or is on the ropes (Brewer, 1974; Gardener, 1985). The emergence of cognitive behaviorism within the behavioral tradition itself is striking evidence for this

(Bandura, 1986; Erwin, 1979; Kazdin, 1978). Similarly, earlier reductionistic versions of sociobiology have given way to proposals that include a role for mind, whatever be their merit (Kitcher, 1985; Lumsden and Wilson, 1981).

Nevertheless, there are several problems with Sperry's assessment of behaviorism and sociobiology and his implicit critiques of the proposals of Skinner and Wilson for a science of values. But, I believe that with some clarifications and adjustments in all three proposals one can conclude that they are not only mutually compatible, but also mutually supportive. First, though, we need to clarify Sperry's distinction between cognitive and non-cognitive values.

Sperry identifies cognitive values as such "things" as environmental soundness, species rights, peace, and world community and non-cognitive values as such "things" as shelter, food and sex. Both sets refer to objective phenomena: persons, living things, objects and their properties, states, processes and relationships. Thus, though Sperry's terminology on this point tends to be misleading, both cognitive and non-cognitive values refer to objective phenomena and not just to ideas in the case of the former and to objects in the world in the case of the latter. Sperry's point is, I believe, that some values influence us because they come to be grasped cognitively and thereby motivate us as cognitively grasped goals to act in achieving them. On the other hand, other values need not be cognitively grasped in order to influence our behaviors. So Sperry's distinction between cognitive and non-cognitive values is not, I believe, an ontological, but a functional one, referring to the locus of motivation for value-based behavior. Sperry also seems to have another distinction in mind: cognitive values originate in our cognitive interaction with the environment, while some non-cognitive values are innate. This latter distinction is based on the primary causal origin of values in their motivational mode. We have then values as (1) objective phenomena, (2) as subjective motivational factors, either cognitive or non-cognitive, and (3) as subjective motivational factors originating either environmentally—such as cognitive values and learned non-cognitive values, or genetically—such as non-cognitive values.

Since, in Sperry's view, a behavioral approach has no place for the mental, it has, he implicitly assumes, no place for values. Thus, Skinner's proposal (1971) for a science of values would appear to be without foundation. If we take behaviorism as a position which excludes a causal role for the mental in the effecting of behavior, then Sperry is correct in concluding that behaviorism has no place for *cognitive* values. But insofar as behaviorism offers an adequate explanation of some human behaviors through the mechanisms of operant and respondent conditioning, the case is not closed against the Skinnerian proposal for a science of values (Ringen, 1986; Schwartz and Lacey, 1982). Sperry himself allows for the effects of reinforcement and punishment



and their psychological correlates, pleasure and pain. These are for Sperry a type of non-cognitive value. And he seems to take the identification and explanation of such non-cognitive values as non-controversial. Thus, as a part of a genealogy of morals, a Skinnerian science of values in terms of positive and negative reinforcers could help provide an account of the origin, development and maintenance of learned, non-cognitive values. But there is a more important lacuna in Sperry's proposal as it relates to behaviorism. Sperry, I believe, takes the opposition between behaviorism and mentalism in too definitive a fashion. With the emergence in the last twenty years of cognitive behavioral theories, behaviorism has undergone a radical transformation (Bandura, 1986; Erwin, 1979; Kazdin, 1978). And although the nature of the connections between behaviorism and cognitive behavioral theories is a matter of continuing discussion, it is clear the cognitive behavioral accounts of behavior allow for internal, cognitive mediation of reinforcing effects. As such there is no reason for these explanations to be excluded from Sperry's science of values. To the extent that such values are also primarily environmental in origin, they also belong to the set of cognitive values.

Sperry (1983) also finds sociobiological accounts inadequate because he believes that they reduce all values to non-cognitive status (Pugh, 1977). Because of this he finds them materialistic. Nevertheless, a science of values will need to take into account genetically based motivational factors, if there be such (Kitcher, 1985; Ruse, 1986). Moreover, I think that Sperry fails to take adequate notice of the role of cognitive mediating mechanisms in recent sociobiological accounts of human motivation (Kitcher, 1985; Lumsden and Wilson, 1981; Wilson, 1978). These latter sociobiological accounts could also find a place in Sperry's science of values.

But even though biologically based and learned values can be cognitively mediated, they would seem, in Sperry's view, to remain on the lower level of the values hierarchy. They are lower level values about everyday needs rather than higher level values about the meaning of life. The question naturally arises about the causal connections between higher and lower values. Are there connections, for instance, between the desires for food and for peace? Sperry does not give us much to go on in answering this question. His thesis on the hierarchic ordering of values seems to belong more to the area of justification rather than of genealogy as does his view that cognitive values provide guidance in the acquisition of learned non-cognitive values. A connection can, however, be made in a natural way within a framework that includes a modest role for sociobiology and behavioristic principles (Flanagan, 1982). For if we make the plausible assumption that the unconditioned reinforcers identified by operant explanations are genetically based, then learning is initially a process of making links between unconditioned and conditioned reinforcers. So we can envision a chain of reinforcers leading from,

for instance, mother's milk, to the presence of mother, to mother's approval, to the value of mother in herself. Thus, what was first sought because of the reinforcing consequences it brought comes to be sought in itself. Moreover, we can see on this view that Sperry's distinction between non-cognitive and cognitive modes of mediation of the motivational potency of values is plausibly interpreted as a continuum, rather than as a dichotomy, in which both non-cognitively mediated affective preferences and cognitively mediated value beliefs are more or less present and operative.

The adequacy of this kind of account of the causal linking of the motivational power of cognitive and non-cognitive values is of course another question. My point is that a limited acceptance of non-reductionistic sociobiological and behavioral views gives Sperry a way to fill in an important lacuna in his genealogy of morals with accounts that are completely congruent with his scientific naturalistic intentions for ethics. We shall find that Sperry's efforts to provide justification for naturalistically based ethical principles also profit from some coordination with sociobiologically and behavioristically based proposals. It is to that issue of justification that we are now ready to turn.

### A Justification of Morals

Sperry's focus at the metaethical level is on the question of the very possibility of a science of ethics. He attempts to turn back the traditional objection that a science of ethics is impossible because it commits the naturalistic fallacy. In Sperry's formulation (1983, p. 14) we commit the naturalistic fallacy by thinking that our scientific conclusions about objective matters have any relevance for the subjective realm of values. The paradox that this fallacy expresses, namely, that our most powerful mode of knowledge is completely useless to us in our attempt to solve our most pressing problems, should lead us to suspect, Sperry believes, that we have made a serious error somewhere.

In Sperry's view, the error arises because of both a continued acceptance of an outdated view of the limits of science and a reliance on outdated science. The two problems are connected. The outdated science is a behavioristic view of mind that attempts to explain human behavior without appeal to the mental. Such a science could only lead, Sperry contends, to a reductionistic view of humankind that finds no place for values and one that suggests that the sciences, even the behavioral ones, cannot, in principle, say anything about values. Sperry, however, maintains that the cognitive revolution in psychology and his own emergent mentalism correct these mistakes. Thus, Sperry attempts to refute the charge that his proposal for a science of ethics commits the naturalistic fallacy by arguing that the dichotomy between fact and value upon which the purported fallacy rests is itself untenable. Given the results and prospects of cognitive psychology and the cognitivized neurosciences,

Sperry contends that we can legitimately hold that science can address the realm of the subjective. And since cognitive values are an important subset of ideas formed by the complex interaction of the environment and our innate and learned cognitive structures, scientists can study, on the one hand, the developmental and environmental origins and maintenance of values, and, on the other, their role in effecting behaviors.

But Sperry's undoing of the fallacy only partially bridges the gap between fact and value. The alleged gap between fact and value may be conceived in various ways. One type of gap is explanatory. Science can explain facts but not values. This is the gap that Sperry's mentalism, if correct, removes. Insofar as values are ideas which cause us to do what we do and insofar as science proves itself able to understand and explain our behaviors in terms of values, the explanatory gap can be bridged. Such explanations, however, belong to a genealogy of morals and ethical behavior.

But that is not sufficient. For one could grant to Sperry that the behavioral sciences can give a causal account of how values of either the non-cognitive or cognitive sort bring about human behaviors while maintaining that these sciences are unable to give any rationale for why they do so. In other words, one may grant that a scientific explanation could show how ideas cause behaviors without showing why values motivate behaviors. Sperry needs to bridge the motivational as well as the explanatory gap.

In order to build a bridge over the motivational divide, it will be helpful to look in more detail at the explanatory patterns involved in Wilson's and Skinner's proposals for their respective sciences of values. There are good reasons to hold that both the evolutionary and operant patterns of explanation upon which these sociobiological and behavioral theories are built are teleological rather than causal in character (Rottschaefer, 1980a, 1980b, 1982a, 1982b). I take causal explanations to be aimed at finding the necessary and/or sufficient *antecedent* conditions of a behavior given certain background assumptions. Teleological explanations, on the other hand, are in terms of the *consequences* of the phenomenon to be explained (Ringen, 1976; Wright, 1976). Such explanations have been called by some *teleonomic* to distinguish them from teleological explanations in terms of conscious purposes (Mayr, 1974). In the case of evolutionary explanations, traits and behaviors are explained by means of their contributions to the fitness of an organism (Brandan, 1981; Mayr, 1974). In the case of operant explanations, behaviors are explained in terms of the reinforcing effects of behaviors (Ringen, 1976). And Skinner (1971, 1974) makes it clear that operant effects are themselves ultimately grounded in the genetic makeup of the organism (Smith, 1983). Such explanations of behavior are accounts of why an organism does what it does, not how, because they refer to consequences rather than antecedents as explanatory. As a result, they can be invoked to explain the motivational capacity of what Sperry calls

non-cognitive values. Moreover, there is a natural extension of this explanatory pattern from non-cognitive values to cognitive values. Cognitive behavioral theorists as well as cognitive psychologists generally offer explanations in terms of the cognitively held goals of agents and not merely in terms of the causal antecedents, cognitive or otherwise, of behaviors (Bandura, 1986; Dennett, 1981; Rottschaefer, 1982a, 1982b). For it is the anticipated consequences of one behavior rather than another that can lead to the choice and execution of one of several proposed behaviors by a cognitive agent. Thus, if we supplement Sperry's causal account of the role of values in bringing about behaviors with a teleological account, it seems that, in principle at least, the behavioral sciences can explain not only how values cause behavior but why they motivate them.

But this bridge does not seem to take us far enough either. For even if we grant that the behavioral sciences can explain not only how ideas influence behaviors but why, the gap Sperry needs to span concerns moral agency. We are still left with the task of accounting for the prescriptive and justificatory role of values. Sperry needs to bridge the prescriptive-justificatory gap.

This task leads us naturally to Sperry's second suggestion for understanding and dissolving the problematic character of the fact/value dichotomy. Sperry (1983, p. 22.; p. 50; p. 73ff) believes that this thesis on the hierarchic character of values and the role of first ethical principles in determining subordinate principles in the value hierarchy allows us to do this. He claims that the prime value determinants of our behaviors are the basic values embodied in our first ethical principles, principles that deal with the ultimate meaning of life, thus, with human nature and its relationships with cosmic forces, living and non-living. In Sperry's view, the most adequate source for such principles is our best current scientific knowledge rather than religious authority, intuition or mysticism. Consequently, the values that prescribe and justify what we do are to be drawn from such scientifically based principles. Sperry is not particularly concerned with the justification of particular ethical norms, for instance, prohibitions against murder or cheating. Nor does he attempt to support in any but a cursory fashion the several versions of a first ethical principle that he proposes. He usually argues in support of such principles by claiming that they represent best current scientific knowledge.

How does the adaption of such scientifically based principles help us to overcome the prescriptive-justificatory gap? Sperry's discussion of the causal role of cognitively grasped values does not, I believe, answer this question. For the bridging of the prescriptive-justificatory gap requires more than accounts of how values influence behavior and why they motivate. It demands an explanation of how values make a behavior morally requisite and an understanding of why a behavior is what it ought to be. One way to fulfill

these requirements that accords with Sperry's intent is to introduce a naturalistic principle that bridges the prescriptive-justificatory gap. If we conceive of the goal of ethical practices to be individual and social human fulfillment, then we can argue that knowledge of what counts for such fulfillment depends on a knowledge of human capacities and that the latter knowledge is best found in what Sperry has called the behavioral sciences. Sperry's various formulations of first ethical principles fit this suggestion that values are things that fulfill human potentialities. Reference to whether or not actions and practices fulfill these potentialities can serve both to give prescriptive and justificatory force to ethical norms and principles.

Since my intent is the limited one of fitting Sperry's proposal about values into a larger naturalistic project for ethics, I shall not here attempt to examine the justification for the introduction of such a principle nor its merits relative to other approaches to metaethical justification (Edel, 1980; Hudson, 1970; Richards, 1986a, 1986b; Ruse, 1986). However, it should be noted that the sources for the justification of the principle need not be exclusively scientific nor non-scientific. Put more positively, the sources of such a principle can be found in ordinary knowledge, scientific theory, and philosophical reflection (Edel, 1980; Held, 1984). Moreover, the naturalistic principle I have proposed for bridging the prescriptive-justificatory gap is formal in the sense that neither human potentialities nor their fulfillment have been specified. How are we to identify these potentialities and their fulfillment so that particular behaviors and more general moral principles may be prescribed and or justified to the degree that they allow for the actualization of these potentialities? Following Sperry's proposal for a science of values, such knowledge will come in its best form from the sciences, from biology, psychology and the social sciences (Flanagan, 1984; Held, 1984). This is not to say, I believe, that other cognitive sources are entirely excluded. It seems entirely consonant with Sperry's program that ordinary experiential knowledge plays an intrinsic role in the acquisition of knowledge about human capacities and their actualization. Moreover, Sperry believes that religious traditions, shorn of supernaturalistic beliefs, are also a valuable source of ethical wisdom. But even if we grant that Sperry's proposals for the metaethical justification of scientifically based value claims require the sort of naturalistic principle that I have proposed, much remains to be done both in elaborating a scientifically based naturalistic ethical system and examining its merits relative to other systems, both naturalistic and not.

### Conclusion

Roger Sperry's proposal for a science of values, based as it is on his thesis of mental emergentism, overcomes the criticisms leveled against similar reduc-

tionistic sociobiologically and behaviorally based proposals for making ethics scientific. It does so because it recognizes from the perspective of the neurosciences the crucial role of the mental in any account of the genealogy and justification of values. Supplemented by non-reductionistic sociobiological and behavioral accounts of values, as well as contributions from the social sciences, it opens up the possibility of an account of the origin, development and maintenance of values ranging from the genetic to the socio-cultural. With the assumption of the naturalistic principle that human values are to be identified with what fulfills human capacities, Sperry's proposal allows us to argue that the behavioral sciences, broadly interpreted, provide us with the most adequate knowledge of these capacities and how they can best be fulfilled. I have not here attempted to defend such a principle. My concern rather has been to show how Sperry's proposal for a science of values fits within and contributes to a more general project for a scientifically based naturalistic ethics.

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