

Reviews

Unsnarling the World-Knot: Consciousness, Freedom, and the Mind-Body Problem. By DAVID RAY GRIFFIN. Berkeley: Univ. of California Press, 1998. 266 pages. \$45.00.

The “knot” in the title of David Ray Griffin’s concentrated and passionate defense of human freedom and consciousness is taken from Arthur Schopenhauer’s vivid term for the set of problems plaguing the relation of body and mind. Griffin, professor of religion and executive director of the Center for Process Studies at Claremont Graduate University, has as his central motivation in proposing answers to the mind-body problem his hunch that both dualism and materialism are spent in this effort and must soon give up the ghost and the machine, respectively. Griffin’s book is also drawn from the metaphysics of Alfred North Whitehead as modified by Charles Hartshorne and by the author himself. His main thesis stems from the central Whiteheadian claim that both materialists and dualists are hopelessly lost in the Cartesian fallacy that matter (as opposed to mind) has no experience in itself and exerts no final causation. Griffin’s third way between dualism and materialism is an account of matter in which the smallest event-units (e.g., quarks) actually experience, in which their experiences are affectively toned, and in which they themselves are subjects, before they become objects for any other subject. Griffin’s system is certainly physicalist, a point he makes at some length in chapter 10 as he weighs his panexperientialism against the supervenience of mind suggested by Jaegwon Kim. His exposition will be of interest to readers who seek a clearly presented critique of both materialistic and dualistic accounts of consciousness and freedom. It will especially appeal to those who wish a response to these hard problems from a perspective of process philosophy/theology.

Griffin’s book is divided into two major sections. In chapters 1–6 he presents a careful, engaging examination of the difficulties proposed by previous approaches to the world-knot. Here Griffin’s main partners in conversation are materialistic philosophers of the knot such as Colin McGinn, John Searle, and Galen Strawson, although dualists such as John Eccles and W. D. Hart make an occasional appearance. He begins in chapter 1 by defining the problems that concern him, noting that he is certainly *not* addressing the question of how experience arises out of nonexperiencing things. He moves on to take materialists to task for their “wishful and fearful thinking” (p. 11) and quotes Searle in support of his contention that “the currently dominant materialistic views are held so widely and so tenaciously, in spite of their implausibility” because materialists are terrified of alternative paradigms (p. 12).

In chapters 3–6 Griffin strongly advocates for the notion of hard-core common-sense principles, which are those “obvious” truths that are “presupposed in

practice" (pp. 16–18), before he strongly critiques flaws unique to, and shared between, materialism and dualism. The most important examples of hard-core principles for Griffin's case are experiences of consciousness and the presupposition and experience of freedom in deciding courses of action. Thus foremost among his proposed guidelines of discussion is that any proposed answer should "be adequate to *all* the relevant data" (p. 24) and that the "data to which we should give the highest allegiance are our *hard-core commonsense notions*" (p. 25).

Interestingly, although he considers the violation of the conservation of energy as one of the three problems unique to dualism, he does not count it as insurmountable, invoking Hart's "psychic energy" (p. 51) as a means through which dualistic accounts can fulfill the first law of thermodynamics. Griffin unfortunately cites this same psychic energy as the cause behind "ulcers, the placebo effect, and stigmata" (p. 208) as well as extrasensory perception (ESP). It should be noted that his quickness to invent new areas of physics and medicine, along with an unfounded notion that there is an abundance of sound scientific evidence for ESP, are examples of the major flaw in Griffin's book—his failure to consider science in general and cognitive neuroscience in particular in presenting his arguments. It is a major source of frustration in an otherwise well-written and interesting work.

The main part of his argument is found in chapters 7–9. Chapter 7, "Fully Naturalizing the Mind: The Neglected Alternative," is a sustained argument for panexperientialism. Griffin identifies some of the more common objections to this metaphysical system (for example, "rocks can't have feelings") and argues against McGinn especially for a "radical conceptual innovation" (p. 98) in the way the world-knot is approached.

In chapter 8, "Matter, Consciousness, and the Fallacy of Misplaced Concreteness," Griffin does an admirable job of making Whitehead's philosophy intelligible, so readers with some familiarity in philosophy should have no trouble following his argument. After echoing Whitehead's accusation that materialists commit the "fallacy of misplaced concreteness" (pp. 119–24), Griffin defines "experience" in process terms, averring that it does not require consciousness, cognition, or even sensory perception. He presents a clear exposition of Whitehead's term *prehension*, which involves an occasion of experience (that is, experiencing subject + experience), the object of the experience, and the "subjective form" (p. 128) by which it is experienced.

Griffin also makes several strong points in his chapter "Compound Individuals and Freedom." Here he moves from Hartshorne's work to show how Whiteheadian panexperientialism is not vulnerable to the criticism of its being absurd in claiming that rocks have emotions. Rocks, walls, desks, chairs, and other inanimate objects are aggregates of individuals that do not enjoy being compound individuals themselves. Therefore, a rock cannot experience, whereas its individual quarks, atoms, and molecules can. The second point Griffin effectively makes here is against those who claim that moral responsibility does not require metaphysical freedom. This is a fall-back position taken by writers (such as E. O. Wilson) who deny freedom but avoid denying the value of responsibility in moral or ethical sense.

As alluded to earlier, the central frustration of Griffin's work is his seeming lack of desire for an actual explanation of the phenomena of human freedom and consciousness in terms of categories approachable from cognitive neuroscience. He

faults others for their pessimistic conclusion that these questions are beyond the human capacity to understand, yet his approach ties our hands as fast, because it eschews—or at best ignores—empirical approaches.

Griffin maintains that introspection is “the most *direct way to observe nature*” (p. 142) and that we should know that all actualities in nature (including its smallest units) do experience, if only for a short duration, simply because we have such experience. The inner experiences of other subjects, though, is forever off limits to us, because by the time we experience them, their subjectivity, their “time of ‘enjoyment’” (p. 154), has passed.

This applies to brain cells as well. Although neurophysiologists speak in terms of objects, the real truth is that each cell has a subjective experience of its own that is forever beyond the reach of an outside observer. Each cell, in fact, “must embody, to use the current jargon, ‘qualia’” (p. 145). Griffin uses an example of the color red to make this point explicitly. After reaffirming that it “is impossible to understand how, apart from supernatural intervention” (p. 145), we can see red if our brain cells are “devoid of all qualia” (p. 145), Griffin suggests that we see the color red only because of a “transmutation effected by more or less high-level experiences out of ‘red as felt’” (p. 145). Human consciousness, qualia, and freedom arise because experience, qualia, and self-determination are “subjective universals” (p. 152) exhibited by all experiencing individuals. In making this case, Griffin is extremely effective in pointing out the limits of both materialistic and dualistic answers to the mind-body problem. *Unsnarling the World-Knot* is a guide to the tangles created by traditional approaches to the mind-body problem. Yet while the reader is left wiser at the end of the book, the world-knot remains unaffected, as tight and as much of a trip wire as ever.

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Genealogies of Religion: Discipline and Reasons of Power in Christianity and Islam. By TALAL ASAD. Baltimore: Johns Hopkins Univ. Press, 1993. 335 pages. \$42.50 (\$15.95 paper).

For a variety of reasons, some of which may be the direct result of the complexity of his thought and the subtlety of his analysis, the work of Michel Foucault has yet to have any significant effect on the ways in which we study religion. Postmodernism in general has had a tremendous influence in Christian theology, but it has done little to dislodge the long-held scholarly assumptions regarding the utter distinctness and autonomy of the signifier “religion.” Precisely because of the complexity and the novelty of Foucault’s corpus, if in fact one can go so far as terming it a “body”—a metaphor that invites a Foucaultian critique—it would be ambitious at the least to believe that one could find its essence. If there is one thing that Foucault’s studies of the clinic, the prison, human sexuality, and madness have taught other scholars, however, it is that analyses of essences and things in themselves are not half so intriguing as an examination of the relationship between the ways we talk, write, and act in social groups and the ways that all of these processes

manufacture the *things* we talk about, fight over, despise, and cherish. So it is not madness or religion that interests the Foucaultian scholar but rather our *discourses* on madness and religion—the manner in which we treat and characterize other people, their stories, and their behaviors and our changing attitudes toward these others.

For scholars committed to the belief that religion, to whatever extent, somehow transcends human knowledge and historical causes, this Foucaultian insight on the utterly taxonomic and highly contested nature of all epistemological claims is troubling. Foucault himself wrote little about religion, for religions are simply one among a countless number of sites at which human beings create and subsequently contest knowledge, power, and privilege. Instead, his novel methodology was developed through the study of French prisons and asylums. But precisely because temples, synagogues, mosques, chants, ordination, and canons, to name only a few “religious” discursive sites, have been important sites for such contestation, a Foucaultian analysis of the ways in which we construct religion as a privileged and autonomous object is long overdue. It is for this reason that *Genealogies of Religion* is a most welcome and challenging book.

Talal Asad, an anthropologist at the City University of New York, has written and edited a number of studies that address such issues as the relations among colonial power, cultural definition, scholarly commitments, and economic and material privilege. Perhaps some readers will be familiar with his earlier study of cultural translation in British social anthropology that originally appeared in James Clifford and George Marcus’s highly influential edited compilation, *Writing Culture: The Poetics and Politics of Ethnography* (Berkeley: Univ. of California Press, 1986). *Genealogies* is a collection of eight essays written by Asad (all but one, including the piece from *Writing Culture*, are reprinted, and the originals generally date from the mid- to late 1980s) with a detailed and most useful theoretical introduction. The essays all differ in manifest content. They include a politically nuanced and critical analysis of Clifford Geertz’s celebrated definition of religion as a symbolic system; the genealogy of the concept of “ritual” as it developed in anthropological scholarship; the role of “pain,” “discipline,” and “humility” in medieval Christian discourses; the place and limits of public argumentation in Muslim societies; and two intriguing analyses of the implications of “the Rushdie affair” (the first on its effects on the construction of multicultural identity in Britain and the second on the relations among ethnography, literature, and politics). What unites these essays is Asad’s “assumption that Western history has had an overriding importance—for good or ill—in the making of the modern world, and that explorations of that history should be a major anthropological concern” (p. 1). Each essay examines a specific, delimited site on which, in Asad’s opinion, Western hegemony has been articulated, has been maintained, and has normalized the “other.” Asad’s work, then, constitutes a study of the politics of representation as found in the academic study of religion and culture—a style of critical analysis that has been rather successfully applied in many other scholarly areas (notably anthropology and literary theory) but has yet to gain wide access to the religious studies conclave.

The political implications of scholarly representations hinge on James Clifford’s statement (as quoted by Asad) that “self-other relations are matters of power and rhetoric rather than of essence” (p. 9). If one agrees, in typically Foucaultian fashion one is forced to conclude, along with Clifford, that “a whole structure of ex-

pectations about authenticity in culture and in art is thrown into doubt.” And this problematic authenticity is not simply reserved for the object of the scholar’s analysis but necessarily implies the authenticity and detached authority of the observer as well. A resounding theme of Asad’s essays, then, is the intricate manner in which we are all “mutually entangled” in the construction of one another—from the level of individuals to that of participants-observers and eventually to entire cultures.

Asad’s theoretical basis is set out in a well-argued introductory essay that takes as its point of departure a speech in which Marshall Sahlins criticizes the assumption, widespread in some contexts, that one of the results of European colonialism has been the creation of seemingly passive populations who have had their history made for them by those nations that possessed greater material wealth and political power. According to Sahlins, it is misleading to chronicle the history of the world on the basis of the categories of “before” and “after” European imperialism, for during such invasions and even after them these colonized peoples were still intentional agents involved in making their own history. In other words, “since everyone is in some degree or other an object for other people . . . no one is ever entirely the author of her own life” (p. 4). Asad’s reply is succinct and convincing: “even the inmates of a concentration camp are able, in this sense, to live by their own cultural logic. But one may be forgiven for doubting that they are *therefore* ‘making their own history’” (p. 4). Simply put, although we all are implicated in one another’s construction, some of us have the added advantage of material and social power to ensure that one set of standards to judge the adequacy of our constructed identities is routinely presented and made normative.

Applied to scholarship, this thesis would assert that in spite of their apparent neutrality, scholarly methods and assumptions as well as oppositional ideologies play a role in cultural hegemony. One need look no further than the first essay, “The Construction of Religion as an Anthropological Category” (pp. 27–54), which deals with Geertz’s definition of religion, for a suitable example of Asad’s genealogical (and therefore oppositional) critique. Ernest Gellner’s critique of Geertz as one of the founding members of a modern oppositional stance within anthropology that has attempted but failed to compensate for the evils of colonialism (see Gellner’s *Postmodernism, Reason, and Religion* [New York: Routledge, 1992], pp. 40–72) is surprisingly similar to Asad’s. Asad examines the universalist assumptions of Geertz’s definition of religion as a symbol system. Although Gellner’s and Asad’s critiques are based on radically different theoretical, even political, commitments (the former positivistic, the latter postmodern), both find in Geertz’s work a failed attempt to employ postmodern insights. For Gellner, the assertion that one cannot necessarily know the other without simultaneously constructing the other leads to the conclusion that one cannot know oneself, either. Therefore, communication is impossible. There exist no criteria to determine the adequacy or validity of claims, and we are left reciting autobiographical statements that have more to do with promoting our personal agendas than with descriptive statements about the world at large that can be debated and falsified.

However, in spite of the cultural relativism for which Geertz’s work is known (the very relativism that is the focus of Gellner’s critique), Asad argues that Geertz actually (and ironically) minimizes the sociopolitical and cultural particularity of human behavior and organizations in his very effort to generate a universal yet culturally relative definition of religion. Hegemony proliferates in the most ironic

of situations. Asad writes, "My argument is that there cannot be a universal definition of religion, not only because its constituent elements and relationships are historically specific, but because that [universalist] definition is itself the historical product of discursive processes" (p. 29). He has two complaints: first, that universalism implicitly involves ahistorical essentialism inasmuch as universalist definitions posit a distinct datum (in this case religion) that is conceptually separate "from the domain of power"; and second, that theorists who claim universal applicability for their definitions and theories are ignoring or willfully disguising the historical, social, gendered specificity of the definition itself. In other words, such scholars essentialize themselves as universal, unattached theorists and definition makers.

Given his Foucaultian basis, Asad provides a powerful argument against conceptions of a *sui generis* object of analysis in the study of religion. As he phrases it, "the insistence that religion has an autonomous essence—not to be confused with the essence of science, or of politics, or of common sense—invites us to define religion (like any essence) as a transhistorical and transcultural phenomenon. It may be a happy accident that this effort of defining religion converges with the liberal demands in our time that [religion] be kept quite separate from politics, law, and science. . . . This [essentialist] definition is at once part of a strategy (for secular liberals) of the confinement, and (for liberal Christians) of the defense of religion" (p. 28). That literary theorists long ago made the explicit links between liberal politics and the presumed autonomy of such categories as "the canon" and "literature" does not lessen the relevance of this insight as applied to scholarship on religion—one of the last remaining vestiges of essentialism in the modern university.

As inviting as Asad's critique may appear to be, it will surprisingly trouble not only those historians of religions who have invested much time and effort in the supposed sociopolitical autonomy of religion but also those positivistic scholars of religion who see much at stake in the continued demarcation of religion and religious claims from scientific claims to knowledge. Indeed, in criticizing the social and political motivations behind the very boundaries between the insider/devotee and the outsider/social scientist, Asad's antiessentialist and antiuniversalist position effectively terminates the European-based nonconfessional study of religion as practiced by what we might term reductionistic scholars. In other words, postmodernists see little difference between Eliade and Durkheim. It would seem that, given the postmodern critique, the future of the field rests firmly in the success of cross-disciplinary studies—again, something recommended by literary critics long ago.

Each of the chapters in this collection is well argued and well documented. For those interested in contemporary issues, the two concluding essays on the implications of the Rushdie affair will be particularly useful. Especially intriguing is Asad's critical analysis of the attempts of the British government to define civility, liberalism, and "Britishness" in the wake of the protests that took place in Britain against *The Satanic Verses*—attempts that smack of colonialist and controlling rhetoric. Generally, Asad's postmodern insights into the highly constructed and tactical nature of human identity, as well as the theories developed to explain such identities, are consistently applied throughout all eight essays. In explicitly addressing the manner in which those in socially and politically dominant positions of power and

privilege at once speak for and exclude the other, Asad's work constitutes one potent site of opposition to the hegemonic juggernaut that, ironically, pays all of our wages.

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This is Biology: The Science of the Living World. By ERNST MAYR. Cambridge: Belknap Press of Harvard Univ. Press, 1997. xv + 327 pages. \$29.95.

Ernst Mayr's work will be familiar to many readers of *Zygon*, for he is a biologist who has long been concerned with historical and philosophical questions arising from his discipline. His 1982 history of biology, *The Growth of Biological Thought: Diversity, Evolution, and Inheritance* (Cambridge: Belknap Press of Harvard Univ. Press), has become a classic in the field of the history of science. In a similar way, his *Toward a New Philosophy of Biology: Observations of an Evolutionist* (Cambridge: Harvard Univ. Press, 1988) has to be examined by anyone today who explores the philosophical implications of evolutionary science. Mayr's is a mind rooted in the particularities of his own research in zoology that ramifies in many other intellectual realms.

This same holistic approach informs Mayr's most recent volume, *This is Biology: The Science of the Living World*. Mayr is concerned about the increasing specialization in the disciplines of science and addresses here especially the fragmentation of the discipline of biology. Indeed, one of his explicit goals is to provide biologists trained in subspecialties a holistic understanding of the field of biology: "Geneticists, embryologists, taxonomists, and ecologists all consider themselves to be biologists, but most of them have little appreciation of what these various specialties have in common and how they differ fundamentally from the physical sciences. To shed some light on these issues is a major purpose of this book" (p. x).

Yet Mayr has in mind a broader audience, for he realizes that "every educated person should have an understanding of basic biological concepts—evolution, biodiversity, competition, extinction, adaptation, natural selection, reproduction, development, and a host of others that are discussed in this book" (p. xv). And here is where the book will be of considerable interest to those interested in the relations between the questions asked by science and those asked by religion. For Mayr succinctly and clearly gives an excellent overview of the many facets of biology today, addressing philosophical and moral implications along the way.

Before dealing with the subdisciplines of biology, Mayr deals with general questions of the nature of science and biology's particular object of study: life. In chapter 1, "What is the Meaning of 'Life'?" he explores the history of the debate between the physicalists, who argued that life was really not different from physical matter, and the vitalists, who saw life's essence as something different from physical matter and its laws. He sees the modern notion of organicism as a better

approach than these two earlier views, in that it recognizes that living things are more than the simple sum of their physical components while rejecting the need to appeal to some nonphysical principle to explain life. Rather, organicism sees that key to living systems is the notion of *emergence*: “in a structured system, new properties emerge at higher levels of integration which could not have been predicted from a knowledge of lower-level components” (p. 19). As a result of emergent properties, organisms have characteristics that “distinguish them categorically from inanimate systems.” Mayr argues that those characteristics included the capacities for evolution, self-replication, growth and differentiation, metabolism, self-regulation, response to stimuli, and change at the levels of phenotype and genotype (pp. 22–23).

In the next two chapters, “What is Science?” and “How Does Science Explain the Natural World?” Mayr explores a brief history of the rise of science, examines the way that science differs from theology, philosophy, and the humanities, and discusses the objectives of scientific research. In the latter chapter Mayr criticizes contemporary philosophy of science, arguing that it is based on the physical sciences and the centrality of the notion of law therein, whereas biology is based not so much on laws as on *concepts* and their role in forming theories in biology.

This differentiation between the methods of biology and the physical sciences is further developed in chapter 4, “How Does Biology Explain the Living World?” Mayr argues that the form of explanation in biology is different from that of the physical sciences in that historical case studies often play a crucial role in such research and that causal explanation in biology often invokes just such historical explanation.

After a chapter that takes up again an argument with contemporary philosophy of science concerning the question, “Does Science Advance?” Mayr begins his survey of the major subdisciplines of biology and the questions they ask. In chapter 6, “How are the Life Sciences Structured?” he explores a bit of the history of how the biological disciplines have been structured and then outlines the method he will use in presenting the subdisciplines in the remaining chapters, by focusing on the major questions those subdisciplines ask. Chapter 7 explores the “‘What?’ Questions: The Study of Biodiversity”; chapter 8, the “‘How?’ Questions: The Making of a New Individual”; and chapter 9, the “‘Why?’ Questions: The Evolution of Organisms.” Using this scheme, he presents the major subdisciplines of biology, discussing the current foci within each. Chapter 10, “What Questions Does Ecology Ask?” explores the new subdiscipline of ecology and the major concepts it uses in its holistic approach to organisms and their environments.

Chapter 11, “Where Do Humans Fit into Evolution?” is an excellent summary of current theories of the development of *Homo sapiens* from primate and hominid ancestors. Mayr also in this chapter explores the impact of cultural evolution on the biological evolution of the hominids, noting that “major factors that favored an increase in brain size were the development of speech and the acquisition and generational transmission of culture that speech allowed” (p. 238). Mayr’s final chapter, “Can Evolution Account for Ethics?” explores the implications of evolution on our understanding of human moral behavior and argues that a “biologically informed” ethical system “which takes into account human cultural evolution as well as the human genetic program . . . would be far more consistent internally than ethical systems that ignore these factors” (p. 249). Drawing on C. H.

Waddington's theory "that ethical norms have to be acquired from earliest childhood on, by an imprinting-like process, and that such instruction has to be incessant" (p. 264), he suggests that "all one would have to do to improve the situation [of moral education] drastically is to step up ethical instruction and begin it at the earliest possible age" (p. 264). He concludes the chapter by pointing to three ethical problems that he thinks today challenge the sufficiency of the ethical norms developed in Western culture: the change in our thinking about the value of those who are not in our group, our "excessive egocentricity and attention to the rights of the individual," and the need to take responsibility for nature as a whole (pp. 266–67). Although one may disagree with the rather traditional approach to moral education explicated in this last chapter, one must appreciate Mayr's attempts to take his expertise and understanding of biology and apply it to the broadest and most fundamental problems that humanity faces today.

That is why this book is valuable. It represents the kind of synthetic cross-disciplinary thinking that is so badly needed in the academy today. Regrettably, the cross-disciplinary thinking that goes on in this book does not include religion. Indeed, readers of *Zygon* will surely find his comparison of science to theology (pp. 33–35) woefully dependent on a model of theology that is traditionally supernaturalistic. Nonetheless, the scope of this work in helping all of us better understand the biological sciences makes it a valuable addition to the tools available to those who seek to interrelate religion and science.

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River Out of Eden: A Darwinian View of Life. By RICHARD DAWKINS. New York: Basic Books, 1995. 161 pages. \$3.99 (paper).

It takes Richard Dawkins only four "letters" to explain the foundation of the form and function of life: *A*, *T*, *C*, and *G*. Dawkins proposes that a Darwinian model founded on genetic determinism is sufficient to explain the existence and development of all life on earth. The elegance and simplicity of this answer is matched by the succinctness and brevity of his book. Written as part of the Science Masters Series, which seeks to make important scientific ideas available to a broad audience, Dawkins presents his ideas clearly and with numerous examples.

Dawkins spends much of the book outlining a Darwinian model of evolution. In chapter 5 he states that the possibility of self-replication is a necessary precondition to the development of living organisms. This condition is fulfilled through the function of DNA and, more specifically, through the permutations of the "letters" that compose DNA: *a*denine, *t*hymine, *c*ytosine, and *g*uanine. Important in self-replication is the copying process through which the messages encoded on DNA are transmitted. In chapter 1 Dawkins explains the importance of the fact that genes carry and transmit information through digital rather than analogical codes. The maintenance of the fidelity of the messages encoded on the genes

across broad spans of time is vitally important for accurate copying. Digital codes provide the medium through which the fidelity of the message is preserved to a remarkably high degree. In conjunction with the digital copying process is the basic Darwinian premise of gradual evolution. Indeed, Dawkins spends all of chapter 3 providing a solid defense for the possibility that at least some highly complex organisms could develop through gradual evolutionary changes from simpler structures. Yet while Dawkins provides a clear outline of Darwinian evolution in these chapters, due to the brevity of the book and an approach that is highly controversial in the philosophy of science, his effort is only minimally effective in convincing the skeptical reader of his strongly reductionistic philosophical position.

From his Darwinian model of evolution, Dawkins builds his central thesis in chapter 4: Living organisms are complex DNA survival machines. The evolving changes in each living organism are the stratagems by which DNA is able to preserve the life of the organism it inhabits, so that it may copy and transmit its messages: "All the organs and limbs of animals; the roots, leaves and flowers of plants; all the eyes and brains and minds, and even fears and hopes, are the tools by which successful DNA sequences lever themselves into the future" (p. 150). Although this thesis is strongly reductionistic, the simplicity of its premise (that permutations of adenine, thymine, guanine, and cytosine are responsible for the existence and variations of all living organisms), combined with the broad manner in which Dawkins is able to apply his explanation to numerous examples from the animal kingdom, renders his position compelling (even if not wholly convincing).

The next step—applying genetic determinism to the development of human beings and more specifically to the development of culture from genetic predispositions—is, however, for the most part avoided by Dawkins. The strongest and closest example he gives that might lend itself to application in the gene-culture debate is the explanation of the "dance language" of honeybees. Dawkins explains the complicated structure of communication manifested in the "dance language" of a "society" of honeybees in terms of genetic determinism. The "dance language" and social ordering of the honeybees might be construed as analogous to a rudimentary form of human language and society. By and large, however, Dawkins bypasses such connections, focusing his attention instead on physiological and behavioral characteristics of animals.

In terms of trying to appeal to a broader audience—which would contain social scientists, philosophers, and theologians—Dawkins's decision not to expand the discussion to possible developmental causes above the genetic level (though consistent with a thesis of strong genetic determinism) is not likely to convince many readers from these fields of study. Additionally, in light of the renewed interest in theories of epigenesis—the scientific theory that from physical structures arise functions that both act back on those structures and are not reducible to them—Dawkins's decision not to go beyond the genetic level to address functions such as human culture that occur above the genetic level limits both the explanatory power and persuasiveness of his ambitious thesis.

Dawkins does on a few occasions venture beyond the bounds of biological science (though in a manner that sometimes appears incidental and ancillary to the main body of his text) to speculate on some epistemological and ethical ramifications of his position. On the basis of his central thesis that living organisms are DNA survival machines, Dawkins argues that the "purpose" driving living organ-

isms, if one is to be construed, is simply the survival and propagation of DNA. “Why” questions—questions that probe any sense of purpose or meaning to life beyond this, such as those that often emerge in philosophy and religion—he thinks are vacuous. This view is consistent with the central idea of his book: that DNA, not human consciousness, is the central player in the processes of life.

Dawkins translates his notion of the “purpose” of life into ethical terms through a brief and somewhat cursory sketch of a utilitarian model of ethics. He argues that “purpose” can be understood in terms of a utility function—the maximizing of some specific action or product. The utility function in living organisms, which is always being maximized, is the survival and propagation of DNA: “the great universal Utility Function, the quantity that is being diligently maximized in every cranny of the living world is, in every case, the survival of the DNA” (p. 120). Dawkins terms this universal utility function “God’s Utility Function.” This use of religious terminology is a barb against religion, which Dawkins uses to underscore his contention that nature is simply the realm in which DNA survival is maximized and is in every case indifferent to suffering and evil. There is no metaphysical structure beyond this to answer the problem of evil; evil is simply part of the natural world that human beings inhabit.

Despite his philosophical interludes, Dawkins’s book should not be read primarily as a systematic probing into the epistemological and ethical dilemmas raised by modern science for philosophy and religion. Rather, it is an attempt to portray simply and concisely a Darwinian worldview that has great explanatory force and carries over into realms trod by religion and philosophy. For example, toward the beginning of his book, Dawkins uses the religious symbolism of the African Eve story in Genesis as a contrast to the account that modern science gives of the early ancestors of human beings. Science, in light of genetics research, tells a “story” about a Mitochondrial Eve—an individual woman to whom the mitochondrial DNA of every human being can be traced.

Dawkins’s scientific account of early human beginnings, one in which there were many possible individual human beings from whom all people today may have originated, is in some respects more compelling and sophisticated than the Genesis account. Dawkins concludes (somewhat hastily), “the story of African Eve is a parochial, human microcosm of a grander and incomparably more ancient epic” (p. 57), an epic story that he thinks is right now being probed and translated into the language of modern science.

Let the stakes be clear. On the whole, Dawkins’s thesis of genetic determinism cannot coexist with a meaningful system of religious beliefs. His reduction of all conscious behavior (including ethical, emotional, and spiritual) to genetic predispositions and programming renders such activity meaningless in any real sense. Religious worldviews have no place in Dawkins’s account of the purpose and function of life.

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