THE USES AND ABUSES OF BIOLOGY

"I find it both depressing and amusing that so many of our intellectual efforts, though masquerading as attempts to understand nature, are really anodynes for justifying our hopes and calming our fears." So says Stephen Jay Gould, a noted Harvard scientist and popular author. For several years, he and his allies have been savaging sociobiologists—and particularly their dean, Edward O. Wilson, also of Harvard—as reactionary apologists for an unjust capitalist order; sociobiologists, in turn, have been no less hesitant to point to Gould's own leftish agenda. Where, one wonders, is *pure* science? Howard Kaye here argues that there is no such thing. In biology, at least, scientists' descriptions of how the natural world works inevitably draw upon personal views of how human society ought to be.

by Howard L. Kaye

Socrates told us that it is not to the trees or to the beasts of the country that we are to look for knowledge of how to live but rather to "the men who dwell in the city." Alas, poor Socrates lived in the days before the dramatic scientific breakthroughs associated with modern biology. Since the 1960s, such distinguished scientists as Konrad Lorenz, Jacques Monod, Francis Crick, and Edward O. Wilson have been spreading the good news to a surprisingly receptive public: Now, they proclaim, with our knowledge of the working of genes, the biology of animal behavior and social organization, and the machinery of the primate "mind," we can at last "biologize" the social sciences and moral philosophy.

The sweeping claims and enormous popular success of such works as Lorenz's *On Aggression* (1966), Monod's *Chance and Necessity* (1971), and particularly Wilson's *Sociobiology* (1975) and *On Human Nature* (1978), have provoked a torrent of passionate criticism [see "Sociobiology," *WQ*, Summer '77, Autumn '79]. Much of

Charles Darwin, 1809–1882.

the clamor has been misguided. Most critics focus on the potential political misuses of biology to justify sexism, racism, and economic inequality. Some, including Stephen Jay Gould and other members of the Science for the People group, have gone so far as to link contemporary efforts with the sort of pseudoscientific eugenics theories that "led to the establishment of gas chambers in Nazi Germany."

However effective polemically, such brown-shirt waving will not do. Sociobiology can be used to support any and all political positions, from the most revolutionary to the most reactionary. "Biophilosophers" such as Lorenz and Wilson may indeed speculate about the biology of sex-role differences and of human aggression in ways that many find objectionable, but the critics are hardly rendered defenseless. The realm of nature is so vast and Darwinian fables so easily constructed that virtually any cause can find its mascot, any group its biological totem.

Critics, moreover, miss the main point when they attack the biophilosophers for their accounts of specific social patterns (e.g., genes for homosexuality or male dominance). In fact, the claims made by some recent biophilosophers are far more grand—nothing less, in some cases, than solutions to the remaining mysteries of life's origins,

workings, and ends. The biophilosophers propose to tell us who we are, what we can become, and what we must now do to live properly.

What is the status of such metaphysical and moral claims—science or speculation? What is their significance? And what exactly is the relationship between the legitimate scientific work of these biologists and the human implications or applications they claim to draw from that work?

Biologists Gould and Richard Lewontin and philosopher Philip Kitcher, though not alone, have been in the forefront of a movement that challenges *human* sociobiology on scientific grounds. They denounce its illogic and lack of rigor. Valid as such objections may be, they leave too many questions unanswered. How, for instance, can the same scientist be so rigorous in illuminating the behavior of macromolecules and slime molds and so fraudulent in studying our own molecules and behaviors? If so many otherwise exemplary scientists have strayed so badly along a path so fraught with danger, why have they done so at this particular historical juncture?

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To most critics, such as Kitcher, the answer lies in the observation that contemporary biology (and biologists) have two faces—one legitimate, scientific, and admirable when addressing DNA and nonhuman animals, the other arrogant, unscientific, and potentially evil when studying man. In an increasingly conservative age, when Western democratic capitalism cannot make good on its promises of liberty, fraternity, and equality for all, biology's Mr. Hyde persona becomes attractive and useful, once again, as an ideological defense of the status quo in the West, as it allegedly has been since the days of "Spencerian social Darwinism."

In addition to substituting name-calling for analysis, the critics' argument obscures continuities that *do* exist between the nonhuman and human dimensions of these scientific works. Moreover, because critics have misunderstood past uses of biological theories in social thought ("the survival of the fittest" as capitalist "ideology," for example), they misunderstand their present significance as well.

If contemporary biophilosophers from Crick to Wilson have erred in viewing their analyses of human society as logically derived from objective and unambiguous scientific facts, their adversaries

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Howard L. Kaye, 35, is professor of sociology at Franklin and Marshall College. Born in Washington, D.C., he received a B.A. in history from the University of Pennsylvania (1974), an M.A. in comparative literature from the University of Chicago (1975), and a Ph.D. in sociology from the University of Pennsylvania (1981). This essay is adapted from his book, The Social Meaning of Modern Biology, from Social Darwinism to Sociobiology *(Yale, 1986),*

have been no less mistaken in branding all such efforts as "social Darwinism," that is, as a cruel ideological attempt to use biological ideas and analogies to explain and thereby justify existing social conditions by rendering them natural and inevitable. The critics seem to ignore the fact that such ideas can just as easily be used to denounce the existing social order as "unnatural" as to sanction it.

Indeed, since the publication of *On the Origin of Species* in 1859, Darwinian theory and other prominent biological principles have been used to support a wide range of political and economic possibilities from anarchism to totalitarianism, from laissez-faire capitalism to socialism. Contemporary Marxists in particular are all too prone to overlook Marx's and Engels's own use of Darwinism and Lamarckism to lend scientific authority to their social visions.*

The historical cliché of social Darwinism is of only limited value in illuminating both past and present social-biological efforts. Nevertheless, contemporary critics are right to remind us of the century-long debate that Darwinian theory has inspired.

Immediately upon its dissemination in 1859, Charles Darwin's theory of organic evolution by natural selection, like the more recent work of molecular biologists and sociobiologists, sparked wide debate among social and moral thinkers in the West. The weakening hold of Christian supernaturalism on Victorian minds created an intellectual and spiritual vacuum. Because Darwinism bore the imprint of theological, philosophical, and social ideas, it proved to be both attractive and accessible to many 19th-century seekers.

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Darwin's revolution, it is important to recall, was an intellectual upheaval that drew as much on other people's ideas as on field work and careful observation. From William Paley's works on natural theology, for example, Darwin derived both his working assumption about each organism's perfect adaptation to its environment and the optimistic vision of divine justice that he so deeply craved. Nature's obvious cruelty, Paley declared, led inevitably to further progress.

Thomas Malthus's *Essay on the Principle of Population* (1798) provided Darwin with the insight that population pressure and the struggle for existence it inevitably caused in nature (where it was free of human moral constraints) were the engines of evolution. The writings of Herbert Spencer, Walter Bagehot, and other social theorists helped to provide Darwin with evolutionary explanations of our most prized mental and moral traits. The prehistory and nature of man could thus be incorporated into his biological scheme. And Darwin's own metaphysical commitment to naturalism encouraged him

*In an 1860 letter, Marx wrote that "Darwin's book [*Origin of Species*] is very important and serves me as a basis in natural sciences for the class struggle in history."

to include such extrabiological considerations both to complete his theory and to remind arrogant Anglo-Saxons to practice greater humility and compassion toward other species and races.

These were just some of the ideas and interests that helped to inspire and shape Darwin's efforts, both in the *Origin of Species* and *The Descent of Man* (1871). Their inclusion in his theory in no way keeps it from being one of science's greatest triumphs. Nevertheless, Darwin's breakthrough can hardly be cited as an example of objective facts gradually producing explanatory theory through the judicious application of reason and logic.

To many of our contemporary scientists, such as microbiologist Bernard Davis, the presence of "extrascientific" influences in any scientific work constitutes bias, error, and "a corruption of science." That view is remarkably naive. As philosophers and sociologists of science have begun to argue, extrascientific biases may be invaluable as sources of scientific insight. Such appears to be the case with Darwinism. Even if Marx were correct in claiming that Darwin projected onto nature the brutal competition and Malthusian struggle for existence of 19th-century English society, the usefulness and legitimacy of the theory would hardly be destroyed.

Whether as a source of truth or error, the metaphysical presuppositions and moral concerns imbedded in Darwin's language—with its vocabulary of "natural selection" (suggesting to many a Natural Selector), "survival of the fittest" (suggesting inevitable progress), "higher" and "lower" forms of life, and "progress toward perfection"—encouraged a wealth of theological, philosophical, and social speculation.

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Despite their variety, 19th-century debates about the human meaning of Darwinism shared many concerns and strategies. To theologians and social theorists, theists and atheists, capitalists and socialists, Darwinism's human implications appeared both attractive and disturbing. Theirs was an age in which Christian belief and Biblical authority were in decline. Western societies were experiencing rapid and disorienting changes. Consequently, the idea of evolution, both organic and social, proved invaluable as a source of guidance and reassurance. It gave a cheerful meaning to "progress," with which it was identified. To those who wished to remain Christian, evolution, properly understood, appeared to reconcile the teachings of their faith with the teachings of modern science. Although it challenged Biblical accounts of creation, the "fact" of evolutionary progress seemed to many to prove God's existence and benevolence and to place Christian providence on a scientific footing.

To those like Darwin and Spencer who no longer wished to be

believers but wished to retain Christian morality, evolution, properly interpreted, gave the practice of virtue a scientific rather than a supernatural basis. Evolution provided fables about the adaptive advantage of virtue and promised its ultimate diffusion and triumph throughout the world. Even to those like Marx who wished to challenge both Christian belief and its "bourgeois" morality, evolution, properly modified, could be used to sanction the necessity of social change. Furthermore, its suggestion of progress insured the ultimate beneficence of the historical process.

As a theory of *evolution*, Darwinism thus proved to be an invaluable and highly flexible means of lending the authority of science and nature to a number of conflicting political, religious, and philosophical claims.

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But as a theory of evolution by *natural selection*, Darwinism proved to be a serious problem for everyone. Natural selection, with its emphasis on random variation, population pressure, and competitive struggle, suggested a nature that was "clumsy, wasteful, blundering, low and horribly cruel," as Darwin himself lamented. And a nature ruled by war, accident, famine, and death could easily appear godless and utterly indifferent to human hopes, regardless of their religious or political content.

Thus natural selection, the essence of Darwin's theory, seemed to undermine the moral and metaphysical benefits of the idea of evolution. To mitigate its threat to man, Darwinian theory variously had to be reinterpreted, altered, or even rejected. Intellectuals of all persuasions developed a variety of responses, the most common of which during the 19th century was to embrace the mechanisms of evolutionary development outlined by one of Darwin's predecessors, French naturalist Chevalier de Lamarck (1744–1829).

In contrast with Darwin, Lamarck accounted for the origin and spread of adaptive traits through the *direct* action of the environment on an animal or plant population, the effects of use and disuse of various traits, and the inheritance of these acquired traits. The appeal of the Lamarckian vision is obvious: It suggested that each organism had simply to stretch out its own neck or grow a thicker coat in order to adapt itself and its future offspring to the environment. According to this more genial scheme of things, there was no need for a creature to suffer, compete, and die while waiting for favorable, genetically based traits to arise and spread throughout the population.

Downplaying the role of natural selection in *human* development, thinkers as disparate as Spencer and Marx (and many theologians too) concluded that conflict need not be a permanent feature of human life. Even Darwin took comfort in the thought that inheritance

of acquired mental and moral traits would assure a steady and largely peaceful advance toward greater human intelligence and virtue.

For that minority of scientists, social theorists, and theologians remaining firm in its rejection of Lamarckism, other solutions to the problem of natural selection were possible. Some, including English naturalist Alfred Russel Wallace (1823–1913), simply insisted that natural selection played no role in the development of human mental and moral qualities; only supernatural intervention could account for their existence.

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Others such as anarchist Peter Kropotkin and Scottish preacher Henry Drummond argued that "the law of Mutual Aid" or the "struggle for the Life of Others," not natural selection, was responsible for evolutionary progress. Still others, often from Puritan backgrounds, were drawn to arguments like that of Yale's William Graham Sumner, who held that the struggle for existence was fought between nature and society, not by man against man. In such a struggle, evolution sanctioned cooperation, virtue, and industry, not force and cunning. "Fittest" thus referred to the morally fit, not to the physically strongest.

With the erosion of faith in Lamarckism, thanks in large part to the work of German biologist August Weismann during the 1880s and '90s, the challenge of natural selection and its role in human lives had to be met anew.* If it were not, then only the law of chance, struggle, and death would remain. But such a law clearly *was not* and above all *must not* be the only law governing human affairs. Human social evolution, as many in the new fields of sociology and anthropology began to argue, could not be reduced to organic evolution. Such nonbiological, "cultural" processes as innovation and learning played at least as great a role in human destiny.

This argument from "culture," given scientific support by T. H. Huxley in his famous lecture on "Evolution and Ethics" in 1893, emerged in the 20th century as the principal means of defending human hopes and values, for a number of reasons.

One was the eugenics movement. Aimed at "improving" the human species through the process of selective breeding, the movement acquired a particularly sinister aspect during the interwar years. Hitler's scheme to eradicate non-Aryans and to create a "super-race" of blond Teutons made most applications of biological theory to humankind seem highly suspect.

Biological explanations of the human predicament were made even less attractive by the development of the so-called Modern Syn-

*Distinguishing between soma cells and germ cells, Weismann argued that the latter, as carriers of hereditary determinants, could not be altered by the behavioral or morphological changes of an organism during its lifetime.

thesis in population genetics during the 1930s. Largely the work of three prominent biologists—Ronald A. Fisher and J. B. S. Haldane of Cambridge, and Sewall Wright of the University of Chicago—this approach combined Darwin's theory with Gregor Mendel's work in genetics. The synthesis brought quantitative rigor to the study of evolution and filled in a number of gaps in Darwinian theory (e.g., the origin of variation). It also tended to strip "the survival of the fittest" of its qualitative connotations. In place of the Larmarckian idyll of inevitable progress and the Neo-Darwinist nightmare of brutal struggle, the Modern Synthesis substituted colorless mathematical formulations in which evolution was revealed as a simple change of gene frequencies within breeding populations. Fitness was defined as nothing more than quantitative reproductive success.

The potential loss of both nature and science as authoritative guides to right living proved unacceptable to many, including some of the leading theorists of evolutionary biology.

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Julian Huxley, for example, complained that to conceive of fitness solely in terms of differential reproductive rates was to imply that the only direction in evolution was toward the production of more life. Rejecting such a disquieting implication, Huxley insisted that evolutionary biology disclosed a number of *progressive* trends in nature. The most important of these was progress toward the fulfillment and spiritual development of man. Such scientific knowledge, Huxley argued, constituted a new "Religion without Revelation," which he believed provided the human species with a fresh source of consolation and inspiration.

In similar ways, other scientists, including C. H. Waddington, G. G. Simpson, and Theodosius Dobzhansky, succeeded in infusing the story of evolution with meaning and reassurance for man. They did not simply describe evolution by natural selection as a consequence of random variation, differential survival, and reproductive rates. They personified and praised it for its "creativity" and "opportunism," discovering various progressive forces at work (e.g., greater complexity and adaptive flexibility). These forces, they believed, were conducive to greater human happiness and freedom.

Liberated from the messiness of organic evolution and the meaninglessness of its statistical nature, man had once again been preserved in his position of ascendancy over nature, free to pursue his "higher" concerns above the vulgar struggle for "mere survival." He could feel secure in the knowledge that his existence and superiority were not accidents but the culmination of an eternal creative process. By 1960, after a century of debate over the social and spiritual meaning of Darwinian theory, *Homo sapiens* found himself

where he had been a century earlier: at the "crown of creation."

Nothing had changed. European and American intellectuals of all persuasions had managed to respond to the challenges of Darwinism and its subsequent refinements in such a way as to reestablish Western hopes and values on a seemingly scientific foundation.

The shriveled husk of Christian mythology may have been discarded by many, and its kernel of morality, providence, and redemption dangerously exposed, but with the aid of new myths drawn from the science of evolution, that kernel could still be preserved. In the 19th century, this task of what psychologist Donald Campbell has termed "value salvage" was accomplished primarily through Lamarckism and other myths of inevitable progress. During the 20th century, Western intellectuals came to depend increasingly on a sharp distinction between biology and culture.

In short, what characterized the first 100 years of Darwinism's use and misuse was not the theory's ideological status as a rationalization of economic and political interests but its status as a "scientific mythology" serving interests far more metaphysical and moral than economic. As philosopher Stephen Toulmin has noted, science passes over into myth when its ideas and findings are dramatized and overextended not simply to explain natural phenomena but to give an emotionally powerful account of life's origins, workings, and ends. From this account, we in turn derive cosmically and scientifically sanctioned answers to our most troubling questions.

Thus it is today.

In spite of the claims to greater rigor and objectivity by which contemporary molecular biologists and sociobiologists have tried to distinguish their writings from those of the Spencers and Huxleys of the past, their efforts, too, constitute scientific mythologies.

When molecular biologists like Francis Crick, Jacques Monod, and François Jacob speak of the self-replication of DNA molecules as their fundamental "dream" and the "aim" of all life, or speak of evolution as a "wise" and "creative" process, they are not simply explaining the workings of nature and describing the findings of science. When sociobiologists such as Richard Dawkins and Richard Alexander speak of genes as "selfish" and "immortal masters" who "program" and exploit "survival machines" for their own purposes, they are not necessarily making capitalist exploitation and selfishness seem part of the natural order of things. When Crick argues that life on earth may owe its origins to the arrival, billions of years ago, of a spaceship loaded with bacteria sent by a doomed civilization of intelligent creatures like ourselves, desperate to ensure their survival, he is neither developing a scientific hypothesis to be tested nor sanctioning

imperialist expansion. Such personifications of natural phenomena serve instead as a means of arousing our emotions, shaping our thoughts, and guiding our actions.

But whereas the evolutionary myths of Darwinism's first 100 years were used to shift moralities and cultural assumptions that had been religiously established onto a seemingly scientific basis, the aim of contemporary efforts is far more revolutionary. For if evolution in its wisdom has created all organisms, including ourselves, as expressions of DNA programs and devices for its replication, we must radically transform how we think of ourselves and what we value in life. Rather than God-ordained or at least specially endowed beings with souls to save, selves to fulfill, and just societies to create, we must first acknowledge and honor our responsibility as survival machines and live accordingly. To the extent that our societies diverge from our true biological interests they are maladaptive and must be corrected. To the extent that our culture diverges from biological necessities it becomes dangerous and must be reconstructed around life's highest value: the survival and continued evolution of the gene pool.

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That the reductive implications drawn by our contemporary biophilosophers are indeed culturally revolutionary is made quite explicit by these authors. Crick, for example, insists that while the science of biology is in the midst of shattering the traditional world view and values of Western culture, it "should [also] become the basis on which we are to build the new culture." Such a "scientific" culture, with biologists as our guides, will free us at last from our harmful "prejudice about the sanctity of the individual" and of our fatal delusion about our special status in nature.

With similar enthusiasm, French biochemist Jacques Monod argues that "the molecular theory of the genetic code" will destroy, at last, "the disgusting farrago of Judeo-Christian religiosity, scientistic progressism, belief in the 'natural' rights of man, and utilitarian pragmatism," along with the misguided values of salvation, justice, and self-fulfillment based upon them. In their place, science will sanction a new ethic based on "a clearsighted appreciation of the urges and passions, the requirements and limitations of the biological being."

For Edward Wilson, too, the discovery of the "morality of the gene"—our knowledge that any organism is "only DNA's way of making more DNA"—totally discredits the myths and moralities of our Western heritage. At the same time, it replaces them with a "genetically accurate and hence completely fair" morality for man.

What had been feared and resisted for a century after Darwin—that the science of biology would corrode Western souls and transform the cultural order—is thus now readily acknowledged and even

celebrated by some of our foremost scientists. To them, our moral task in life is no longer, in Tennyson's phrase, to "move upward working out the beast, / and let the ape and tiger die," but rather its opposite—to tame the wild beast of culture and restore, in Friedrich Nietzsche's phrase, "the eternal basic text of *Homo natura*."

The biologists claim that such a Nietzschean "transvaluation of all values" represents a valid deduction from unambiguous and objective scientific facts. But their claim proves to be baseless.

Scientific speculation about the biological basis of human value judgments has not, as many scientists and philosophers now argue, eliminated the philosophical distinction between facts and values. Exploring the social and spiritual implications of their work, biologists have not acted in the disinterested fashion of scientists from another planet, as they so often claim. They have instead been powerfully motivated by an identifiable set of earthly philosophical commitments, social concerns, and mythological ambitions.

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Nevertheless, it would be incorrect to attribute the derivation of social teachings from fundamental scientific discoveries simply to a "naturalistic fallacy"—an illogical leap from facts to values and from science to myth motivated by extrascientific concerns. The boundary between science and a world view is, unfortunately, less clear than both scientists and their critics imagine. As in the case of Darwinism, what has rendered the transition from "is" to "ought" so subtle and attractive to so many is the presence, within the scientific ideas themselves, of such metaphysical presuppositions and social interests. It is *because* of the views imbedded in some of the central theoretical formulations of modern biology that they seem to resonate so strongly with human significance.

The concerns of today's molecular biologists, ethologists, and sociobiologists of course differ greatly from their Darwinian predecessors. As the scientists themselves readily acknowledge, the makers of our current biological revolution share an abiding faith in a world view of mechanistic reductionism, a faith that precedes, rather than reflects, their fundamental scientific discoveries.

From Darwin to Dobzhansky, it was precisely such a program of reducing biology to physics and chemistry, and virtue to reproductive fitness, that was so consistently denied. But for today's biophilosophers, the assumption that the laws of the physical sciences can account for the behavior of all living things, including the minds and societies of men, constitutes a guiding principle in both their scientific explorations and their social speculations.

Inspiring such strikingly similar formulations as Crick's "Central Dogma" of molecular biology (DNA makes RNA, RNA makes pro-

tein) and Wilson's "central dogma of evolutionary biology" (natural selection accounts for virtually all morphological and behavioral characteristics in all organisms), the commitment to reductionism transforms their meaning. However fruitful they have proven to be in the scientific enterprise, such statements are used not simply as research strategies or as hypotheses to be tested. They end up serving as unquestioned "truths" about the world, truths to be obeyed.

If we accept as unproblematic and value-free a theoretical and seemingly descriptive language that treats DNA as a "blueprint" or "program," organisms as chemical "factories" and "cybernetic systems" serving DNA replication, behavior and social organization as "survival strategies" and "environmental tracking devices," or even humans as "animals," then moral implications do indeed appear plausible, regardless of the fine points of the logic.

If all organisms are genetically programmed, then we too must be. Hence genetic "reprogramming" to remove dysfunctional traits appears to be a sensible strategy. If behavioral patterns have evolved as survival "mechanisms," then those of our behaviors that remain adaptive appear good and legitimate; those that are not appear irrelevant or self-destructive and require "retooling."

If we are organisms like all other organisms, then obviously the needs, processes, and aims of organic life ought to take precedence over other interests, once thought to be "higher."

Such mechanical metaphors, which dominate the descriptive and conceptual language of contemporary biology, are not dictated by nature itself. They greatly simplify and even distort some aspects of the working of genes and the nature of organisms, even as they illuminate others. In short, they represent a "mechanomorphism" that has proven to be every bit as value-laden as the anthropomorphisms of the past.

This reductive faith may have been important in shaping the fundamental discoveries of some of our leading biologists and in guiding the particular implications that they draw from their work. But it cannot fully explain the striking combination of urgency and elation with which these scientists have proclaimed to the public the coming cultural transformation. Nor can it account for the equally striking receptiveness of the public to such seemingly radical claims. Contributing to this latest transformation of science into myth is the powerful sense of hostility toward a modern Western cultural order believed to be on the verge of self-destruction—a perspective shared by these scientists and their audience.

Scenarios of doom have certainly proliferated over the last two decades and, remarkably, have often been given the sanction of sci-

ence. To some seers, the coming apocalypse will take the form of overpopulation, genetic deterioration, or ecological disaster—all portrayed as the result of human meddling with, and indifference toward, biological patterns and purposes. To others, most notably Konrad Lorenz and his followers, our cultural self-destruction will probably take the form of nuclear annihilation, once again a symptom of civilized man's sinful divergence from biological needs. As suggested by others, including Crick, Monod, and Wilson, the world may end with a whimper instead, as science at last destroys the unnatural Western beliefs in human uniqueness and divine ordination that have hitherto buttressed its morality and soothed its souls. Whatever its particulars, the sense of impending disaster as punishment for what biological anthropologist Robin Fox calls the "technological hubris" of a "brain-ridden species" has become widespread in both popular and scientific culture.

In such a period of apprehension, the authority and seeming certainty of science become dangerously attractive as a source for human guidance, thereby transforming science into myth. And in an age of intellectual hostility toward the existing cultural order, the confident simplicities of philosophical reductionism become a powerful tool for social criticism, as they have been in such movements as Marxism and Freudianism. But here again the influence of such extrascientific concerns may penetrate more deeply than we ordinarily imagine. They help give shape not simply to speculations about science's human implications but to scientific knowledge itself.

Wilson's monumental and highly regarded text, *Sociobiology*, provides an example of such influence in its very definition of altruism as "the central theoretical problem of sociobiology." As important as the study of self-sacrificial behavior has been in the growing field of sociobiology, its selection by Wilson as the field's central issue remains deeply problematic. So does his use of the concept of altruism to characterize the phenomenon to be studied.

Why not choose the evolution of communication or mentality, as embryologist C. H. Waddington suggested, especially since the mystery of altruism had already been solved by Darwin and Haldane, among others?* And why use such a value-laden term as "altruism" to characterize any behavior that may have the *effect* of decreasing the personal reproductive fitness of the acting organism while increasing the reproductive fitness of other organisms?

Although Wilson and other sociobiologists have been criticized for their misuse of language, such language has a clear philosophical

*Darwin and Haldane demonstrated that "other-benefiting" traits can evolve within a breeding population if the beneficiaries are descendants and near-relations.

and moral thrust. The use of the term "altruism" implicitly asserts the essential sameness of the aggregating behavior of single-celled slime molds, the unpalatability of moths, and acts of human martyrdom. It thereby reduces human intent, volition, and consciousness to mere surface manifestations of genetic calculations. However scientifically productive the focus on altruism has proven to be, its use and centrality reflect a quite self-conscious metaphysical commitment to reductionism, through which Wilson hopes to shed light on our current problems of living.

To Wilson, the fundamental problem faced by all human societies is how to keep in check our "selfish behavior and the 'dissolving power' of high intelligence," how to inspire "more encompassing forms of altruism" beyond those directed toward our kin. Religions have traditionally performed this essentially biological function, but they no longer do so. With our religious myths scientifically discredited, civilization, Wilson warns us, is "in immediate danger of decline" as moral consensus erodes and individuals regress to self-indulgence. Wilson thus defines altruism as the central theoretical problem of sociobiology because it is, for him, the central social and spiritual problem of the day—a problem that he hopes a reductionistic sociobiology will ultimately solve.

No one can doubt the enormous scientific achievements of biological revolutionaries like Edward Wilson. Yet such achievements have been made not *in spite of* their philosophical commitment to reductionism and their hostility toward a dying Judeo-Christian culture but, in part, because of them. Helping to guide the questions asked, the solutions sought for, the observations made, and the interpretations offered, such seemingly extrascientific elements may, at times, prove invaluable to the scientific enterprise.

Yet, however much the triumphs of science may seem to confirm the ideas and interests that helped to inspire them and to encourage their extension into myth, they cannot grant to such social and philosophical speculations the status of objective, positive science. They cannot—and we must not forget this—because scientific knowledge remains the tentative product of passionately committed and socially constrained minds.