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Which Way for the Ecology Movement? Essays by Murray Bookchin

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yond redemption, at least within the terms of its own institutional framework. The thermonuclear fires and the ecological disasters that may engulf our planet will render it irretrievably inhospitable to life—a dead witness to cosmic failure. If only because this planet's history, including itself human history, has been so full of promise, hope, creativity, it deserves a better fate than what seems to confront it in the years ahead.

A society that cuts across the grain of this ethical ontology raises the entire question of its very reality as a meaningful and rational entity. "Civilization" has bequeathed us a vision of otherness as "polarization" and "defiance," and of organic "inwardness" as a perpetual "war" for self-identity. Whatever its validity in the past, this vision now threatens to utterly subvert the ecological legitimation of humanity and the reality of society as a potentially rational dimension of the world around us. Trapped by the perception of a "nature" that stands in perpetual opposition to our humanity, we have redefined humanity itself to mean strife as a condition for harmony, control as a condition for consciousness, domination as a condition for freedom, and opposition as a condition for reconciliation.

Yet an entirely different ethical, philosophical, and social dispensation can be read from the concept of otherness and the inwardness of life. Given a world that life itself made conducive to evolution – indeed, benign, in view of a larger ecological vision of "Nature" – we can formulate an ethics of complementarity that is nourished by variety and creative participation in the natural world guided by reason and empathy, rather than one that guards individual inwardness from a threatening, hostile, invasive otherness. Indeed, the inwardness of life can be seen as an expression of mutualism, not as mere resistance to entropy and the terminus of all activity. Entropy itself can be seen as one feature in a larger cosmic metabolism, with life as its anabolic dimension. Finally, self hood can be viewed as the result of integration, community, support, and sharing without any loss of individual identity and personal spontaneity.

Civilization as we know it *today* is more mute that the nature for which it professes to speak and more blind that the elemental forces it professes to control. Indeed, civilization today lives in hatred of the world around it and in grim hatred of itself. Its gutted cities, wasted lands, poisoned air and water, and mean-spirited greed constitute a daily indictment of its odious immortality. A world so demeaned may well be be-

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organic processes that require no Aristotelian God to motivate them, no Hegelian Spirit to vitalize them. If social ecology provides little more than a coherent focus to the unity of mutualism, freedom, and subjectivity as aspects of a cooperative society that is free of domination and guided by reflection and reason, it will remove the taints that blemished a naturalistic ethics from its inception; it will provide both humanity and a natural world with a common ethical voice. No longer would we have need of a Cartesian—and more recently, a neo-Kantian—dualism that leaves the natural world mute and mind isolated from the larger world of phenomena around it. To vitiate community, to arrest the spontaneity that lies at the core of a self-organizing reality toward ever greater complexity and rationality, to abridge freedom – these actions would cut across the grain of natural evolution, deny our heritage in its evolutionary processes, and dissolve our legitimacy and function in the world of life. No less than this ethically rooted legitimation is at state – all its grim ecological consequences aside—in achieving an ecological society and articulating an ecological ethics.

Mutualism, self-organization, freedom, and subjectivity, together with social ecology's principles of unity in diversity, informed spontaneity, and non-hierarchical relationships, coheers into an ethics of complementarity that sees human beings in a rational, ecological society as playing the creative role of "nature" rendered self-conscious. Aside from the ecological responsibilities this ethics confers on our species as the self-reflexive voice of nature, it literally defines us. "Nature," conceived *as* natural evolution, does not "exist" for us to use; it *legitimates* us and *our uniqueness* ecologically. Like the concept of "being," these principles of social ecology require no explanation, merely verification. They are elements of an ethical *ontology*, not "rules of a game" that can be changed to suit one's personal needs.

ganic identity" and "adventure of form." The clearly visible effort, venture, indeed self-recognition, which every living being exercises in the course of "its precarious metabolic continuity" to preserve itself reveal—even in the most rudimentary of organisms—a sense of identity and selective activity which Jonas has very appropriately called evidence of a "germinal freedom."

Finally, from the ever-greater complexity and variety that raises subatomic particles through the course of evolution to those conscious, self-reflexive life forms we call human beings, we cannot help but speculate about the existence of a broadly and latent subjectivity in substance itself that eventually yields mind and intellectuality. In the reactivity of substance, in the sensibility of the least-developed microorganisms, in the elaboration of nerves, ganglia, the spinal cord, and the layered development of the brain, one senses an evolution of mind so coherent and compelling that there is a strong temptation to describe it with Manfred Eigen's term, "inevitable." It is hard to believe that mere fortuity accounts for the capacity of life forms to respond neurologically to stimuli; to develop highly organized nervous systems; to be able to foresee however dimly, the results of their behavior and later conceptualize this foresight clearly and symbolically. A true history of mind may have to begin with the attributes of substance itself; perhaps in the hidden or covert efforts of the simplest crystals to perpetuate themselves, in the evolution of DNA from unknown chemical sources to a point where it shares a principle of replication already present in the inorganic world, and in the speciation of nonliving as well as living molecules as a result of those intrinsic self-organizing features of reality we call their "properties."

Hence our study of nature—all archaic philosophies and epistemological biases aside—exhibits a self-evolving patterning, a "grain," so to speak, that is implicitly ethical. Mutualism, freedom, and subjectivity are not strictly human values or concerns. They appear, however *germinally*, in larger cosmic and

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The interface between nature and society has been a haunting philosophical, ethical, and cultural problem for thousands of years. Indeed, that it constitutes the stuff from which naïve myths and thoughtful moral credos have been formed for ages is a fact we are seldom permitted to forget, if only in a fashion that is patronizing to presumably less "sophisticated" cultures. After all, were not the earliest religions "mere" nature religions and the earliest philosophies "mere" nature philosophies? As far back as we can search into humanity's rich reservoir of intuitions and rational formulas, our relationship to nature – indeed, humanity's place in nature – has been a central theme of ideas and sensibility. To seek an objective grounding for reason and ethics that is more than crudely instrumental and subjectively relativistic has been the alluring goal of human thought for an incalculable period of time.

It was only with the opening of the Christian era and, centuries later, with the birth of its wayward child, the Renaissance, that this haunting interface was slowly edged out of the realm of human speculation. Christianity's intensely antinaturalistic bias essentially replaced an earlier, richly formed idea of nature with a colorless Supernature as ruthlessly as the late Renaissance philosophers and scientists (notably, Descartes and Galileo) were to replace organic strategies of knowledge with harshly mechanical ones—an umbilical cord between the cathedral and the laboratory that Bacon was to sanctify in his utopian House of Saloman. The results of these ideological changes were more fateful than their creators realized. Human thought was completely deflected from rational inquiry into the relationship of society to nature – one free of the religious and philosophical archaisms of the past – into a narrowly instrumental, means-end rationalism. A distinctly philosophical credo was established in the nature of the new science that was no less metaphysical in its presupposition

that the archaic metaphysics of classical thought: a vision of nature as "mute," "blind," and intelligible only in mathematic terms; a vision of natural history as strictly fortuitous; and perhaps more decisively, an ethical strategy that was grounded not in objectivity and a search for the inherent self-organizing attributes that impart meaning to nature and society but in "effectiveness" and in a logical calculus of efficiency that could be justified only in terms of "success" and personal proclivities. Ironically, the Renaissance vision of society's interface with nature had not removed morality as such from the issue' it has replaced a *committed* vision of right and wrong with an essentially *uncommitted* one. In its scientistic "value-free" but instrumental approach to society, it has in fact provided a means-end rationalism that could as easily justify fascism as it could socialism – and, sadly enough, a uniquely vulgar interpretation of "anarchism" that tends to erupt from time to time like a fetid ulcer in the Anglo-American culture region * Granted that medieval teleology with its rigid mythos of an inexorable "final cause" had permeated speculative thought with the autocracy of a preordained religious destiny; Renaissance mechanism, in turn, lifted the burden of "final cause" only to replace it with an equally rigid mythos of "efficient cause" with its unyielding determinism and its autocracy of reductionism. In neither case was freedom serviced and domination banished. Rather, the same commitment to metaphysical of unswerving determinism was reinforced over more organic concepts of the world that gave it meaning without the all-residing presence of a deity or a machine.

- Consider, for example, an article in defense of contemporary sociobiology in a recent issue of The North American Anarchist (renamed Strike) which deals with nature as "blind…meaningless…mute" and the like, and rehabilitates all the vulgarities of mechanical materialism a la Mettrie or Moleschott. I quote from memory but with a deep concern that this kind of intellectual primitivism may find its place as "ma-

libriated cosmos or in an irrational society. Truth wears an unseen crown in the form of God or Spirit, for nature can never be trusted to develop on its own spontaneous grounds, any more than the body politic bequeathed to us by "civilization" can be trusted to manage its own affairs.

These archaisms, with their theological nuances and their tightly formulated teleologies, have been justly viewed as socially reactionary traps. In fact, they tainted the works of Aristotle and Hegel as surely as they mesmerized the minds of the medieval Schoolmen. But the errors of classical nature philosophy lie not in its project of eliciting an ethics from the natural world, but in the spirit of domination that poisoned it from the start with a presiding, often authoritarian, Supernatural "arbiter" who weighed out and corrected the imbalances or "injustices" that erupted in nature. Hence the dark ancient gods were there all the time, however rationalistic these early cosmologies may seem; they had to be exorcised in order to render an ethical continuum between the natural world and humanity more meaningful. Tragically, late Renaissance thought was hardly more evolutionary than its antecedents, and neither Galileo in science nor Descartes in philosophy performed this much-needed act of surgery satisfactorily. They and their more recent heirs *separated* the domains of nature and mind, recreating deities of their own in the form of scientistic and epistemological biases that are no less tainted by domination than the classical tradition they demolished.

Today, we are faced with the possibility of permitting natural evolution—not Dike, Justitia, God, Spirit, or an *elan vital*—to open itself to us for ethical purposes on its *own* terms. Mutualism is a good by virtue of its function in fostering the evolution of natural variety. We require no Dike on the one hand or canons of "scientific objectivity" on the other to affirm the role of community as a desideratum in nature and society. Similarly, *freedom* is a good; its claims are validated by what Hands Jonas so perceptively called the "inwardness" of life forms, their "or-

its own self-formation. Complexity and subjectivity are more than the effects of life; they are its integral attributes.

The grandeur of an authentic ecological sensibility, in contrast to the superficial environmentalism so prevalent today, is that it provides us with the ability to generalize in the most radical way these fecund, supportive, interrelationships and their reliance on variety as the foundation of stability. An ecological sensibility gives us a coherent outlook that is explanatory in the most meaningful sense of the term, and almost overtly *ethical*.

From the distant Hellenic era to the early Renaissance, nature was seen primarily as a source of ethical orientation, a means by which human thought found its normative bearings and coherence. Nonhuman nature was not external to human nature and society. To the contrary, the mind was uniquely part of a cosmic *logos* that provided objective criteria for social and personal concepts of good and evil, justice and injustice, beauty and ugliness, love and hatred – indeed, for an interminable number of values by which to guide oneself toward the achievement of virtue and the good life. The words *dike* and *andike*—justice and injustice—permeated the cosmologies of the Greek nature philosophers. They linger on in many terminological variations as part of the jargon of modern natural science—notably as "attraction" and "repulsion."

The principal fallacies of archaic cosmology generally lie not in its ethical orientation but in its dualistic approach to nature. For all its emphasis on speculation at the expense of experimentation, ancient cosmology erred most when it tried to co-join a self-organizing, fecund nature with a vitalizing force alien to the natural world itself. Parmenide's Dike, like Henri Bergson's *elan vital,* are substitutes for the self-organizing properties of nature, not motivating forces within nature that account for an ordered world. A latent dualism exists in monistic cosmologies that try to bring humanity and nature into ethical commonality – a *deus ex machine* that corrects imbalances either in a disequi-

terialistic" or "anti-theological" in anarchist ideas. We have as much to fear from kneejerk form of scientism and behaviorism, not to speak of sociobiology, as well have from theology and mysticism.

These general remarks are not made idly. They are indispensable for understanding two conflicting interpretation of the interface between society and nature: sociobiology and social ecology. The historic crisis in reason, science, and ethics which has reached such acuity in recent years – with Renaissance mechanism's underlying tenants of instrumental rationalism, of quantification as the "language" of science, and of physics as its "paradigm" – feeds into a more compelling material crisis: the unprecedented ecological deterioration that threatens the very integrity of complex life-forms, including humanity. None of the critics of instrumentalism, quantification, and reductionism, from the phenomenologists to the critical theorists of the Frankfurt School, could have anticipated that nature itself would raise problems that once seemed confined to the ideological and social realms. The massive disequilibrium between humanity and nature created by a terrifying, exploitive society has thus created the need for a new agenda with roots in an admittedly very old tradition. We are once again faced with the problem of how society emerged from nature, the continuities and discontinuities that exist between the two, the development of a sensibility and of social relations that accord with these distinctions (including reason and science as well as alternative communities and technics), and finally, an ethical that is grounded in nature as it is in human rationality. In short, the old ghosts, seemingly dispelled by the Cartesian and Galilean traditions, have come back to haunt us—not, let me emphasize, for want of the obscurantist ideological needs that many archaic religions and philosophical systems were meant to satisfy, but for want of a *new perspective* on humanity and nature that can resolved the ecological crisis of our times.

It is against this much larger background of ideas and problems that sociobiology's sudden emergence and utterly reactionary content should be evaluated. The idea that society has roots in nature is not new. Until the nineteenth century, the term "natural philosophy" was used as a synonym for the term "science." Hegel's recovery of Aristotelians physics and biology from the theological trappings of the medieval Schoolmen (all his own prejudices and idealistic nonsense aside) exercised an enormous influence in the academic world as a *qualitative basis* for the deductive sciences. Nor can we ignore the influence "dialectical materialism" has exercised even if only as a source of sharp intellectual contentions. Issues like "teleology" and "purposiveness" in nature, however simplistically defined, are central concerns of modern systems theory and neo-positivist philosophies of science, not simply of Teilhard de Chardin's quasi-theological ruminations on orthogenesis.

Sociobiology has oozed into these major intellectual crevices of our times like some ideological pus from a suppurating ulcer. It is evidence not of a cure to the problems that have emerged but of the disease itself. It would be a serious error to view sociobiology merely as part of a persisting endeavor to relate attributes of the organic world to the social or to explore the biological roots of society in terms of their continuities and discontinuities. This project is thousands of years old and has had a highly diversified life of its own. It extends back to the pre-Socratics and has acquired its most conventional form in a neo-Bergsonian vitalism and in systems theory. Sociobiology, as the term is currently used, is a very specific creature in its own right. More precisely, it is not a discipline; it is a movement, no less offensive in its crudities than social-Darwinism. Considered as a movement, sociobiology's manifesto can largely be regarded as E. O. Wilson's *Sociobiology: The New Synthesis*. Its specificity as a "New Synthesis" cannot be ignored. The work of Wilson and his collaborators, some of whose views approximate pure fascism, must be singled out as a new attempt to

ded to organic renewal and ecological stability. Suffering and cruelty properly belong to the realm of personal anguish, needless affliction, and the moral degradation of those who torment the victim. These notions cannot be applied to the removal of an organism that can no longer function on a level that renders its life tolerable. It is sheer distortion to associate all pain with suffering, all predation with cruelty. To suffer the anguish of hunger, psychic injury, insecurity, neglect, loneliness, and death in warfare, as well as of prolonged trauma and terminal illness, cannot be equated with the pain associated with predation and the unknowing fact of death. The spasms of the natural world are rarely as cruel as the highly organised and systematic afflictions that human society visits upon healthy, vital beings—animal as well as human—afflictions that only the cunning of the hominid mind can contrive.

Neither cruelty, aggression, nor competition – all anthropomorphic terms – satisfactorily explains the emergence and evolution of life. For a better explanation we should also turn to mutualism and a concept of "fitness" that reinforces the support systems for the seemingly "fittest." If we are prepared to recognize the self-organizing nature of life, the decisive role of mutualism as its evolutionary impetus obliges us to redefine "fitness" in terms of an ecosystem's supportive apparatus. And if we are prepared to view life as a phenomenon that can shape and maintain the very "environment" that is regarded as the "selective" source of evolution, a crucial question arises: Is it meaningful any longer to speak of "natural selection" as the motive force of biological evolution? Or must we now speak of "natural interaction" to take full account of life's own role in creating and guiding the "forces" that explain its evolution? Contemporary biology leaves us with a picture of organic interdependencies that far and away prove to be more important in shaping life forms that a Darwin, a Huxley, or the formulators of the Modern Synthesis could ever have anticipated. Life is necessary not only for its own self-maintenance but also for

alone. Henry has compiled a two-volume work, *Symbiosis,* that brings the study of this subject up to the mid-1960s. The evidence for interspecific symbiosis, particularly mutualism, is nothing less than massive. Even more than Kropotkin's *Mutual Aid*, Henry's work traces the evidence of mutualistic relationships from the interspecific support relationships of rhizobia and legumes, through plant associations, behavioral symbiosis in animals, and the great regulatory mechanisms that account for homeostasis in planet-wide biogeochemical relationships.

"Fitness" is rarely biologically meaningful as mere species survival and adaptation. Left on this superficial level, it becomes an almost personal adaptive enterprise that fails to account for the need of all species for life support systems, be they autotrophic or heterotrophic. Traditional evolutionary theory tends to abstract a species from its ecosystem, to isolate it, and to deal with its survival in a remarkably abstract fashion. For example, the mutually supportive interplay between photosynthetic life forms and herbivores, far from providing evidence of the simplest form of "predation," or heterotrophy, is in fact indispensable to soil fertility from animal wastes, seed distribution, and the return (via death) of bulky organisms to an ever-enriched ecosystem. Even large carnivores that prey upon large herbivores have a vital function in selectively controlling large population swings by removing weakened or old animals for whom life would in fact become a form of "suffering."

Ironically, it cheapens the meaning of the real *suffering* and *cruelty* inflicted by *society*, reducing them to pain and predation, just as it cheapens the meaning of hierarchy and domination, to deinstitutionalize these socially charged terms and dissolve them into the individual transitory links between more or less aggressive individuals within a specific animal aggregation. The fear, pain, and commonly rapid death that a wolfpack brings to a sick or old caribou are evidence not of suffering or cruelty in nature but of a mode of dying that is integrally wed-

deal with the interface between biology and society, indeed, to give it the halo of a scientific authority that defies mere theorizing and speculation. We are no longer dealing, here, with the Ionian philosophers, Permenides' and Heraklitos' "Dike," Plato's *Demiurgos*, Aristotle's tour de force in the *Physics* and the *scala natura,* Demokratos, Epikurus, the Stoics, or, for that matter, with Bruno, Kepler, Leibnitz, Hegel, Kropotkin, Bergson, and the like. We are talking of a love affair between a new, presumably very "modern" and "sophisticated" group of largely Anglo-American biologists and ethologists on the one hand and genes on the other. The opening chapter of Wilson's *Sociobiology* is titled "The Morality of the Gene" – and it is the book's reductionist and ugly ethos, viewed as a key to society and human behavior, that must never be permitted to elude us.

Accolades for Wilson's "civility" and "appropriate sense of humor" (to use Ashley Montagu's flattering characterization) in the face of very heated attacks upon his views do not justify an equal degree of civility and humor from his critics. There is nothing very civil about sociobiology and certainly nothing very funny about its conclusions. Indeed, the critical response to Sociobiology has been largely favorable. This cordial, often enthusiastic reception has been extended not only by members of the scientific community but by a wide range of the entire political spectrum from writers for Britain's fascist National Front to their counterparts in the happily defunct "Anarcho-Communist Federation of North America."

Wilson, however, does not need reborn fascists and self-styled anarchists to speak on his behalf. He is more articulate and coherent than many of his fervent supporters. The vividness of his emphasis on aggression, hierarchy, domination, territoriality, and competition as genetically innate to all life-forms is so defiantly brash that it has become conventional to critically single out these issues. In Wilson's writings, very few of the less savory aspects of animal and human behavior are free of a genetic pedigree, and with his pedigree they

become biologically inevitable, in fact, adaptative to survival. Such awkward traits as altruism and such patently cultural attributes such as sympathy emerge as problems, into the "morality of the gene." Enough has been written on Wilson's substantive issues raised by his colleagues' works.

Nevertheless, it is difficult to ignore Wilson's intellectual strategy. *Sociobiology* is shrewdly riddled by a sufficient number of second thoughts and qualifications to obscure the viciousness of its thesis. More cautious that such rabidly reactionary acolytes as Richard Dawkins, whose *Selfish Gene* has been characterized by so prudent a critic as Mary Midgley as the "work of an uncritical philosophic egoist," Wilson is careful to take note of the "limits of aggression," to poetize over the "field of righteousness," and to acknowledge the "plasticity of [human] social organization," with due deference to "sharing" and "bonding." But wherever Wilson seems to relax his genetic determinism in the realm of culture, he rarely displaces it completely. *Sociobiology* unceasingly stakes out limits to non-genetic autonomy. Biological determinism, specifically in its crassest genic form, is not merely a massive emphasis but an all-encompassing gospel. Whatever seems to challenge this calling is conveniently removed from the purview of the book. It becomes non-existent or didactically dismissed when it cannot be cajoled by all means – fair or foul – into a genic "paradigm."

And Wilson is by no means so prudent as to abandon foul means. We shall have occasion to see that his genetics, far from being on the cutting edge of genic theories, is in fact rather archaic and shopworn. Nor is his ethological data free of rather cynical distortion. James C. King, in his highly informative and restrained criticism of sociobiology, notes that wedded to Wilson's "single-gene analysis and genetic determinism is … an emphasis on conflict and violence." Wilson's nature, including much of human nature, is ravaged by claw and fang, indeed, by a pervasive social-Darwinism that is denied rhetorically only to be smuggled in substantially. This high-pitch of conflict and

era change more slowly and become extinct less frequently because of the more diversified environments in which they can exist. This "Effect Hypothesis," advanced by Elizabeth Vrba, suggests that evolution tends to be an immanent striving rather than the product of external selective forces. Mutations appear more like intentional mosaics than small, scratch-like changes in the structure and function of life forms. As one observer notes, "whereas species selection puts the forces of change on environmental conditions, the Effect Hypothesis looks to internal parameters that affect the rates of speciation and extinction."

The notion of small, gradual point mutations (a theory that accord with the Victorian mentality of strictly fortuitous evolutionary changes) can be challenged on genetic grounds alone. Not only a gene but a chromosome, both in varying combinations, may be altered chemically and mechanically. Genetic changes may range from "simple" point mutations, through jumping genes and transposable elements, to major chromosomal rearrangements. It is also clear, mainly from experimental work, that permutations of genetically determined *morphological* shifts are possible. Small genetic changes can give rise to either minor or major morphological modifications; the same holds true for large genetic changes.

Trager's observation that the "fittest" species may well be "the one that most helps another to survive" is an excellent formula for recasting the traditional picture of natural evolution as a meaningless competitive tableau bloodied by the struggle to survive. There is a rich literature, dating back to the late nineteenth century, that emphasizes the role played by intraspecific and interspecific symbiosis in fostering the survival of life forms on the planet. Kropotkin's famous *Mutual Aid* summarized the data at the turn of the century, and may have added the word "mutualism" to the biological vocabulary on symbiosis. Buchner has written a huge volume (1953) on the endosymbiosis of animals with plant microorganisms

principle for the evolution of the highly complex aerobic life forms that are common today.

The prospect that life and all its attributes are *latent* in substance as such, that biological evolution is rooted deeply in symbiosis or mutualism, indicates how important it is to reconceptualize our notion of "matter" as *active* substance. As Manfred Eigen has put it, molecular self-organization suggests that evolution "appears to be an inevitable event, given the presence of certain matter with specified autocatalytic properties and under the maintenance of the finite (free) energy flow [that is, solar energy] necessary to compensate for the steady production of entropy." Indeed, this self-organizing activity extends beyond the emergence and evolution of life to the seemingly inorganic factors that produced and maintain a biotically favorable "environment" for the development of increasingly complex life forms. The traditional assumption that life has been forced merely to adapt to an independent, geologically and meteorologically determined "environment" is no longer tenable. This dualism between the living and the nonliving world (which is based on accidental point mutuations in life-forms that determine what species will evolve or perish) is being replaced by the more challenging notion that life creates to a great degree its own environment on a worldwide scale.

Finally, the Modern Synthesis, to use Julian Huxley's term for the neo-Darwinian model of organic evolution in force since the early 1940s, has also been challenged as too narrow and perhaps mechanistic in its outlook. The image of a slow pace of evolutionary change emerging from the interplay of small variations, which are selected for their adaptability to the environment, is no longer as supportable as it seems by the actual facts of the fossil record. Evolution seems to be more sporadic, marked by occasional rapid changes, often delayed by long periods of stasis. Highly specialized genera tend to speciate and become extinct because of the very narrow, restricted niches they occupy ecologically, while fairly generalized gen-

violence is far from supported by the scientific "objectivity" that is supposed to render the sociobiological synthesis so new.

A few examples are worth citing. Wilson's use of Schneirla's data on cats to demonstrate that parent-offspring relations are marked by conflict in weaning kittens from their mother has been justly characterized by King as "close to distortion and point up the predisposition of the sociobiologist to see conflict everywhere." As it turns out, Schneirla's account of this relationship is highly complex: it involves an intricate alternation of lessening concern between the feline parent and its offspring which ultimately yields a condition of interdependence rather than hostility. Even more disconcerting is Wilson's misuse of G.B. Schaller's data on the Serengeti lions. Adducing Schaller's work as evidence, Wilson brashly contends that lion "cubs are sometimes killed and eaten during territorial disputes" – and there the account of high cub mortality is permitted to rest. Actually Schaller and other authoritative ethologists attribute this high mortality rate mainly to parental neglect rather than cannibalism. Acolytes of sociobiology are all the more revealing of their biases when the data around a particular issue is disputable. Almost invariably their interpretations of ambiguous facts fall on the side of aggression, violence, infanticide, and conflict. The more gory the trait, the more likely it is to invite the purpose prose of dogma rather than the staid language of "scientific objectivity".

All of this raises what is most crucial in sociobiology's image of nature – of life as it is formed, of life-forms interacting with each other and their abiotic environment, and ultimately of human nature as it is formed biologically and culturally. Wilson's image of nature, like Freud's, is unequivocally Hobbesian, a *bellum omnium contra omnes*. Methodologically, Wilson is reductionist. What is no less significant, he has an epistemology that renders his subject matter inherently unruly and impervious to explanations that elicit any traits of an immanently symbiotic and mutualistic nature. Human nature, however one chooses

to describe it, is an effect rather than a cause. It is largely the result of the ever-domineering gene. That there are immanent, self-organizing, and – yes, let us use the dreaded word, *harmonizing* – as well as conflicted – tendencies in nature and society which could form the bases of a new biosocial approach to evolution remain notions that are essentially alien to Wilson's sociobiology.

It would be very useful, if space permitted to explore Wilson's definitions of "society," "hierarchy," "dominance," "aggression," "band," "caste," "communal," "competition," and like words that clearly reveal his orientation toward biosocial, evolutionary, socially structured, and ethical phenomena. What is striking about most of these definitions is that, where they have social implications, Wilson firmly contains them by unrelenting, often rigid, *biological* terms. On the other hand, where their biological implications almost beg for interpretation, they are equated with biologically biased *social* terms. What I am saying is that Wilson's ruthless reduction of social phenomena to biology in general and genetics in particular is obscurantist by definition in the literal sense – by his definition of key terms that enter into his book. He renders it difficult for anyone but the most sophisticated reader to use language in such a way that it can reveal the discontinuities as well as the continuities between biology and society. Even more irritating, Wilson so crassly biases his language that the dialectical relations between these continuities and discontinuities become elusive. The perceptive reader, in effect, is stranded on a sociobiological island where it is virtually impossible to consume anything but sand and salt.

This become evident when one turns to Wilson's definition of "society." A "society" in *Sociobiology* is a "group of individuals belonging to the same species and organized in a cooperative manner." The diagnostic criterion is reciprocal communication of a cooperative nature, extending beyond mere sexual

omy of the host … has lead to the hypothesis that certain intracellular organelles might have been originally independent microorganisms." Accordingly, the chloroplasts that are responsible for photosynthetic activity in plants with *eukaryotic*, or nucleated, cells are discrete structures that replicate by division, have their own distinctive DNA very similar to that of circular bacteria, synthesize their own proteins, and are bounded by two-unit membranes.

Much the same is true of the eukaryotic cell's "powerhouse," its mitochondria. The eukaryotic cells are the morphological units of all complex forms of animal and plant life. The Protista and fungi also share these well-nucleated cell structures. Eucaryotes are aerobic and include clearly formed subunits, or organelles. By contrast, the *prokaryotes* lack nuclei; they are anaerobic, less specialized than the eucaryotics, and they constitute the evolutionary predecessors of the eucaryotics. In fact, they are the only life forms that could have survived and flourished in the early earth's atmosphere, with its mere traces of free oxygen.

It is now widely accepted that the eukaryotic cells consist of highly functional symbiotic arrangements of procaryotes that have become totally interdependent with other constituents. Eucaryotic flagella derive from anaerobic spirochetes; mitochondria, from prokaryotic bacteria that were capable of respiration as well as fermentation; and plant chloroplasts from "blue-green algae," which have recently been reclassified as cyanobacteria. The theory, now almost a biological convention, holds that *phagocytic* ancestors of what were to become eucaryotes absorbed (without digesting) certain *spirochetes*, protomitochondria, and, in the case of photosynthetic cells, *coccoid cyanobacteria and chloroxybacteria.* Existing phyla of multicellular aerobic life forms thus had their origins in a symbiotic process that integrated a variety of microorganisms into what we can reasonably be called a colonial organism, the eukaryotic cell. *Mutualism*, not predation, seems to have been the guiding

self-organization into increasingly complex forms. Natural fecundity originates primarily from growth, not from spatial "changes" of location. Nor can we remove form from its central place in this developmental and growth process, or function as an indispensable correlate of form. The orderly universe that makes science a possible project and its use of a highly concise logic – mathematics – meaningful presupposes the correlation of form with function. From this perspective, mathematics serves not merely as the "language" of science but also as the *logos* of science. This scientific *logos* is above all a workable project because it grasps a *logos* that inheres in nature – the "object" of scientific investigation.

Once we step beyond the threshold of a purely instrumental attitude toward the "language" of the sciences, we can admit even more attributes into our account of the organic substance we call life. Conceived as substance that is perpetually self-maintaining or metabolic as well as developmental, life more clearly establishes the existence of another attribute: symbiosis. Recent data supports the view that Peter Kropotkin's mutualistic naturalism not only applies to relationships within and among species, but also applies morphologically – within and among complex cellular forms. As William Trager observed more than a decade ago:

The conflict in nature between different kinds of organism has been popularly expressed in phrases like "struggle for existence" and "survival of the fittest." Yet few people realize that mutual cooperation between different kinds of organisms—symbiosis—is just as important, and that the "fittest" may be the one that most helps another to survive.

Whether intentional or not, Trager's description of the "fittest" is not merely a scientific judgment made by an eminent biologist; it is also an ethical judgment similar to the one Kropotkin derived from his own work as a naturalist and his ideals as an anarchist. Trager emphasized that the "nearly perfect" integration of "symbiotic microorganisms into the econ-

activities – after which mouthful of words, Wilson dispatches the reader to Chapter Two of the book.

It is vitally necessary unless one is a mindless acolyte, to know what Wilson means by "organized" and "cooperative" here – two culturally, philosophically, and ethically laden terms that have far-reaching implications in social theory, not to speak of biology, where their meanings may differ so drastically in the same species (such as baboons) in different ecosystems. One finds, in fact, that Chapter Two in no way clarified the meaning of these highly charged terms. If anything, Wilson wanders all over the place. We no more know what "cooperation," means than we know the meaning of "organization." Wilson's definitions are as arbitrary as they are intuitive. We are urged, in fact, to define the terms "society" and "social" sufficiently "broadly in order to prevent the exclusion of many interesting (!) phenomena" – in whose opinion and by what criteria Wilson fails to explain.

Accordingly, Wilson is now free to opine on any phenomenon that captures his fancy – a totally legitimate right if sociobiology is a purely speculative theory but certainly intellectually outrageous if it is (as its acolytes demands) a "science." We are told, for example, that "swarms of courting males" are not "true societies" because they are "often drawn together by mutually attractive stimuli, but if they interact in no other way it seems excessive to refer to them by a term stronger that aggregation." By contrast, Wilson declares, bird flocks, wolf packs, and locust swarms are "good examples of true elementary societies." So are parent-offspring relationships if they "communicate reciprocally" because they have "often complex and serve multiple functions." Indeed "in many groups of organisms, from the social insects to the primates, the most advanced societies appear to have evolved from family units."

We must pause, here, to examine this fascinating muddle of ideas and categories. If society is to be so broadly defined that it includes bird flocks and locus swarms but not swarms of court-

ing males, by what solid criteria other than Wilson's cavalier use of the word "excessive" are the former distinguished from the latter? All three flocks and swarms are united by some kind of "attractive stimuli"; they perform some kind of "function" and in the "broadest sense" are apparently "cooperating" to fulfill that "function." Taken at face value, Wilson has assigned the notion of internal organization – that is, some vague idea of "group behavior" – as his criterion for distinguishing a "society" from a mere "aggregation." But the swarming of courting males, or for that matter, the winter congregation of rattlesnakes and ladybird beetles (which Wilson also consigns to the status of "aggregations") are forms of "group behavior" in themselves. The fact is that Wilson's criteria in distinguishing "society" from "aggregation" are matters of degree rather than of king. Courting males, wintering rattlesnakes and ladybird beetles are not *sufficiently* "organized" and do not *sufficiently* "cooperate" for Wilson's tastes to qualify in his sovereign opinion as "true societies"; hence by no standards other than his personal judgment are they reduced to "aggregations."

I have emphasized Wilson's biases primarily to argue several key points. Minimally, with bias as its criterion, sociobiology holds to promise of becoming even a reasonably precise science. If fact, it rates very badly as a "new synthesis." Indeed, its claim becomes all the more arrogant because it professes to have achieved an "objectivity" that is ostensibly lacking in the "metaphysical" orientations it explicitly opposes. Actually, one encounters arbitrary judgments everywhere throughout the sociobiological literature and the writings of Wilson's ethological allies. But what is more important—and often less apparent—is that Wilson is seeking something that he never fully finds in the animal world: society conceived as an institutionalized system of relationships—that is to say, the conscious fabrication of associative behavior. Animals may form loosely or tightly aggregated *communities*, but differences in *degree* of aggregation do not determine whether they are *societies*. They

of the cosmos, however differently they function at different levels of self-organization.

My point here is that substance and its properties are not separable from life. Henri Bergson's conception of the biosphere as an "entropy-reduction" factor, in a cosmos that is supposedly moving toward greater entropy or disorder, would seem to provide life with a cosmic rationale for existence. That life forms may have this function need not suggest that the universe has been exogenously "designed" by a supernatural demiurge. But it does suggest that "matter" or substance has inherent self-organizing properties, no less valid than the mass and motion attributed to it by Newtonian physics.

Nor is there so great a lack of data, by comparison with the conventional attributes of "matter," as to render the new properties implausible. At the very least, science must *be* what nature really is; and in nature, life *is* (to use Bergsonian terminology) a counteracting force to the second law of thermodynamics—or an "entropy-reduction" factor. The self-organization of substance into ever more complex forms – indeed, the importance of form itself as a correlate of function and of function as a correlate of self-organization – implies the unceasing activity to achieve stability. That stability as well as complexity is a "goal" or substance; that complexity, not only inertness, makes for stability; and finally, that complexity is a paramount feature of organic evolution and of an ecological interpretation of biotic interrelationships—all these concepts taken together are ways of understanding the natural world as such, not mere mystical vagaries. They are supported more by evidence than are the theoretical prejudices that still exist today against a universe charged with meaning.

This much is clear: we can no longer be satisfied with a passive "dead" matter that fortuitously collects into living substance. The universe bears witness to an ever-striving, *developing* – not merely a "moving" – substance, whose most dynamic and creative attribute is its ceaseless capacity for

duction and evolution. In *What is Life?* this eminent physicist observed that "the most essential part of a living cell—the chromosome fibre—may suitably be called an 'aperiodic crystal.'" The "chromosome fibre" does not merely repeat itself and grow additively, like a "periodic" crystal; instead, it changes significantly to yield new forms—mutations—that initiate and carry on inherited, evolutionary developments.

Graham Cairns-Smith has advanced another hypothesis (one among the many now being proposed and soon forthcoming) that may help clarify the nature of early reproductive processes. DNA is much too unstable chemically, Cairns-Smith emphasizes, to have survived the radiation and heat to which the early earth's surface was exposed. In an analogy that could bear improvement, Cairns-Smith compares DNA with a "magnetic tape: it is very efficient if provided with a suitably protective environment, suitably machined raw materials and suitably complex recording equipment." This machining equipment, he contends, can be found in the organic world itself:

With a number of other considerations, this leads [Cairns-Smith] to the idea of a form of crystallization process as the printing machine, with some kind of crystal defects as the pattern-forming elements. Bring as specific as possible, a mica-type clay seemed the most promising possibility.

Minimally, Cairns-Smith's hypothesis suggests that life, in its own ways and following its own genetic evolution, is not miraculously separated from phenomena existing in the inorganic world. I do not mean to imply that biology can be reduced to physics any more than society can be reduced to biology. Insofar as Cairns-Smith suggests that certain clay crystals could possibly be templates of organic reproductive material and thereby launch the evolution of secondary and still more advanced forms of organic hereditary materials, he is also suggesting that nature may be unified by certain common tendencies. Such tendencies would share a like origin in the reality

merely determine how stable these aggregations are as communities and the range of functions they perform.

The need to distinguish society, a uniquely *human* attribute, from community, a generally organic attribute (which, as we shall see, can apply even to the organization of a single cell), is by no means academic. Indeed, the tendency to confuse the two—an error that is easily make because every society is necessarily also a community—mars the work of such widely disparate thinkers as Marx, Darwin, Kropotkin, and, of course, Wilson. We can ill afford this confusion without yielding the most disconcerting results. A community organized at various levels of aggregation by chemical stimuli, by hormonal and neural relationships, by reproductive functions (mammalian mating rarely occurs without extrasexual or "reciprocal communication"), by learning specific adaptive functions, and finally, by filial, symbolic, economic, and consciously cooperative activities (whether they be ritually, mythically, or rationally expressed) — all of these are patently *not* coequal in form or content. To place a beehive, whose basic function is reproductive, and a town, whose basic function is cultural, under a common rubric, and then to merely distinguish them by their "degree" of complexity is not simply intellectually fatuous but ideologically insidious. Even the "socializing tendency" Kropotkin imputes to nature can be obfuscatory if it fails to recognize that institutions are never strictly or even primarily "natural," however much they seem to parallel fairly complex animal interactions. However prevalent mutual aid may be among nonhuman organisms, *social* cooperation presupposes will and intentionality, which is only dimly present in the animal world. By the same token, the widely touted "division of labor" which is falsely imputed to all kinds of animal communities, particularly the "social insects," is an *economic* fact – a specifically *human* one – not a variegated constellation of complementary functions and activities.

To ignore these distinctions is to invite considerable ideological mischief. Like the notions that nature is "cruel" or "kind," "stingy" or "generous," "harsh" or "gentle," we read back into levels of organic development behavioral criteria that have yet to be consolidated by human thought. Potentiality is not actuality, any more than tendency is the fruition of the possibilities it may yield. Society may be latent in nature, but it only comes into its truth as "true societies" (to use Wilson's jargon) through the cultural, economic, symbolic, and subjective interaction of organisms – and let me emphasize, not by the mere presence of one or two of these traits but by the presence of *all* of them, woven into a common mosaic that is visibly and permanently organized. Social institutions may be rooted in consanguinity or civil relations; they may be agrarian, with rich natural overtones, or urban, with strongly political ones – but in essence they are human because they are fabricated by disparate attributes, minimally conscious, communicative, and cooperatively economic ones. Bees and wasps are decidedly not "social" because their modes of organization, however elaborate and intricate, are massively predetermined by genetic codes. That is to say, they are rigidly fixed along uncreative, undevelopmental, and largely biochemical lines. That they actually form the genic "paradigm" for Wilson's concept of sociality is one of the most sinister features of sociobiology. Largely reproductive in function, the "social insects" represent the antithesis of any concept of evolution as untrammeled and emergent: they open no fresh or creative pathways in organic development but rather only an unswerving fixity and self-replication that form any innovative viewpoint that represent a blind evolutionary alley.

In fact, a genetic strategy that makes the behavior of the "social insects" comprehensible actually renders human society incomprehensible. So-called primate "hierarchies" (a completely libelous term) yield strictly *individual* dominance-submission relationships (another libelous term) on the basis of largely

posed of hydrogen, carbon, nitrogen, and oxygen molecules. Radio astronomers have detected cyanogen, carbon monoxide, hydrogen cyanide, formaldehyde, formic acid, methanol, acetaldehyde, and methyl formate in interstellar space. In short, the classical image of space as a void is giving way to the image of space as a restlessly active chemogenetic ground for an astonishing sequence of increasingly complex organic compounds.

From there, it is only a short leap to the self-organization of rudimentary life-forming molecules. Analysis of carbonaceous chondrites (a group of stony meteorites with small glassy inclusions) yields longchain aromatic hydrocarbons such as fatty acids, amino acids, and porphyrins – the compounds from which chlorophyll is built. In a series of laboratory studies beginning with the famous Miller-Urey "spark-gap" experiment, simple amino acids were formed by passing electrical discharges through a flask containing gases that presumably composed the earth's early atmosphere. By changing the gases in accordance with later theories of the primal atmosphere, other researchers have been able to produce long-chain amino acids, ribose and glucose sugars, and nucleoside phosphates – the precursors of DNA.

Hypothetically (albeit with an impressive degree of supporting evidence), it is now possible to trace how anaerobic microorganisms might have developed simple membranes and how, with increasing complexity, they have emerged as distinct life forms capable of highly developed metabolic processes. Few working hypotheses more strikingly reveal the highly graded interface between the inorganic and the organic than speculations on the formation of genetic structures. Such speculations bring us conceptually to the most central feature of life itself: the ability of a complex mosaic of organic macromolecules to reproduce itself and yet to do so with changes significant enough to render evolution possible. As early as 1944, Erwin Schrodiner may have provided a clue to organic repro-

and ethics – not the logicians, positivists, sociobiologists, mystics, and heirs of Galilean scientism. It is becoming increasingly evident that we are not "alone" in the universe, not even in the emptiness of space, as Bertrand Russell would have us believe. Owing to what is a fairly recent revolution in astrophysics (possibly comparable only to the achievements of Copernicus and Kepler), the cosmos is opening itself up to us in new ways that call for an exhilarating and speculative turn of mind and a more qualitative approach to natural phenomena. It is becoming increasingly tenable to suggest that the *entire* universe may be the cradle of life—not merely our own planet or planets like it. The "Big Bang," whose faint echoes from more than fifteen billion years ago can now be detected by the astrophysicist's instruments, may be evidence less of a single accidental event than of a form of cosmic "breathing" whose gradual expansions and contradictions extend over an infinity of time. If this is so—and we are admittedly on highly speculative groups—we may be dealing with cosmic processes rather than a single episode in the formation of the universe. Obviously, if these processes express an unending form of universal "history," as it were, we, who are irrevocably locked into our own cosmic era, may never be able to fathom their reality or meaning. But it is not completely unreasonable to wonder if we are dealing here with a vast, continuing development of the universe, not simply with a recurring type of cosmic "respiration."

Highly conjectural as these notions may be, the formation of all the elements from hydrogen and helium, their combination into small molecules and later into self-forming macromolecules, and finally the organization of these macromolecules into the constituents of life and possibly of mind follow a sequence that challenges Russell's image of humanity as an accidental spark in an empty, meaningless void. Certain phases of this sequence constitute a strong challenge to a view in which the word "accident" becomes a prudent substitute for virtual inevitabilities. A cosmos interspersed with dust com-

physical attributes – notably, strength, hormonal fortitude, and possibly even intelligence, although the visible distinctions between a "smart" ape and a "dumb" one are barely noticeable in a primate community. It is quixotic ethologists like Jane Goodall-Lawick, rather than apes themselves, who make these uniquely anthropomorphic distinctions. The myth of an intragroup "hierarchy" dissolves completely once we recognize that an "alpha" male chimpanzee is an individual creature, not an institution. His "dominant status" (whatever these words means) lives or dies with the fortunes of the ape, not with the fortunes of the group. Hence, "hierarchy" in the most "caste-like" apedoms or monkeydoms more closely resembles the links in a chain than layers and consciously empowered community structures.

The difference is a crucial one. A weak, enfeebled, unnerved, and sick ape is hardly likely to become an "alpha" male, much less retain this highly ephemeral "status." By contrast, the most physically and mentally pathological human rulers have exercised authority with devastating effect in the course of history and altered its destiny profoundly. The cry "The King is Dead! Long Live the King!" expresses a power of hierarchical *institutions* over persons that is completely reversed in so-called "animal hierarchies," where the absence of institutions is precisely the only intelligible way of talking about "alpha males" or "queen bees." Sociobiology, with its definitional reductionism, totally dissolves these crucial distinctions. "Hierarchy," to Wilson, is a "system of two or more levels of units, the higher level controlling the least to some extent the activities of the lower levels in order to integrate the group as a whole." One is tempted to observe that this "integrative" function must be hot news to an ape or termite. In any case, the terms "system," "levels," "units," and "controlling"—so widely disparate throughout the animal world—are *precisely* the concepts and categories that Wilson is obliged to explain if the notion of "animal hierarchy" is to have meaning. These explanations are all the more necessary because "castes" of "worker bees" (another group of

juicy terms) are in no way comparable to the "alpha males" among primates. Wilson's fast-and-loose interchanging of "levels" and "units" allows him to recklessly pirouette around every part of animal ethology, from beehives to baboon troops. The genetic origins of beehive differentiation are blissfully transferred to less instinct-governed primate groups and then, almost joyously, to strictly contrived human social and political institutions.

From a definitional viewpoint, Wilson's terms and categories almost consistently bed the questions they are required to answer. A "caste" is "any set of individuals … that performs specialized labor in a colony." One is impelled to ask what "labor" means to Wilson in, say, a beehive, a wolf pack, a baboon troop, and a Detroit automobile factory. Can all these "levels" of associations be flippantly subsumed under "labor"? And is "specialization evidence of a "caste," a "profession," a "discipline," a "proclivity," a "calling," each guided by genetic instinctive, psychological, economic, or creative sources? Or, after all, as Wilson would have it, are all of them reducible to the mere expression of "selfish genes" and an anthropomorphic myth of genic "morality"?

If one goes through most of Wilson's remaining socially charged definitions, sociobiology's landscape becomes increasingly depressing. Most seriously, Wilson's genic limits and biased definitions deny both nature and society's fecundity at best—or else dissolve them into the crassest form of social reactionism at worst. Wilson's genic "limits" to human behavior are not ideologically equivocal, even as some of his critics tend to believe. They are socially and politically reactionary. In *On Human Nature*, Wilson closes his tract with lyrical futuristic speculations that are inherently hostile to any emancipatory conception of human freedom. We learn that sociobiology "enlarges" our knowledge of human nature, that we can erect our values on a more "objective basis," notably, a genetic one in which our "set of trajectories" or explanations, far from enlarg-

divine "architect" who fashions it; rather, it would be a *self*-directed and self-*unfolding* drama whose "finality" is as much an inherent property of substance as is motion. It is not simply by virtue of feedback loops and homeostatic mechanisms (the last is a well-chosen word) that substance would unfold self-directively, but rather by virtue of that delicious Aristotelian-Hegelian word "potentiality," the *entelechia* of phenomena, that would yield to the world particulars in their wholeness and fullness as a rich unity of diversity. Hence, "integration" and "oneness" would be reworked to convey the notion of a fecund pattern of interdependent phenomena, an ecosystem whose development comes from its uniqueness, not its homeostatic oscillations alone.

We would thus live in a world that is not lacking in meaning. Perhaps more significantly, such meaning as it had would be liberating in the sense that it would impart to human goals a purposiveness that brings a highly self-reflective nature – mentality itself – into the cosmos, freed from the confines of a purely privatistic and epistemological approach to ethics. We might say with Hans Jonas that this "Ontology as the ground of ethics was the original tenant of philosophy. Their divorce, which is the divorce of the 'objective' and 'subjective' realms, is the modern destiny. Their reunion can be effected, if at all, only from the 'objective' end, that is to say, through a revision of the idea of nature. And it is 'becoming' rather than 'abiding' nature that would hold out any such promise. From the immanent direction of its total evolution there could be elicited a destination of man by whose terms the person, in the act of fulfilling himself, would at the same time realize a concern of universal substance. Hence would result a principle of ethics which is ultimately grounded neither in the autonomy of the self nor in the needs of the community, but in an objective assignment by the nature of things."

What is most fascinating, however, is that "Nature" (*metaphorically* speaking) is writing its own nature philosophy

is an advance of considerable importance. The natural world, in this light, can no longer be seen as "mute," not can life and mind be viewed as the accidental epiphenomena of "blind" cosmic forces. "Nature," to use a highly abstract term, is fecund, not passive, and it consists of more than energy and mass (the traditional "matter" and "motion" mystique that orchestrated the crude materialism of the last century). By the same token, Teilhard de Chardin's "noosphere" is modern Neoplatonism writ large, and Taoist "Oneness" that renders "God" as the "mind of the universe" (Jantsch) regresses to a religious archaism—and dualism—that classical Hellenic philosophy called *logos.*

Ludwig von Bertalanffy, who may well enjoy the distinction of being the most educated of the systems theorists, prudently distinguishes the most significant forms of directiveness or "dynamic teleology." There may be the simple direction of events to their final state or a purposive directiveness which Bertalanffy associates with Aristotle's notion of "final cause" or "equifinality," by which he means a given final state that can be reached in many different ways. Finally, Bertalanffy cites a directiveness "based on structure" which, carried beyond his own limited examples drawn from feedback mechanisms, suggests a concern with the nature of the nature of things. More than two millennia ago, Pythagoras emphasized more pointedly than his formalists (as distinguished from analytic) heirs—I refer here to systems theorists who have no substantial knowledge of the classical tradition—that it is as much in the nature of substance to direct itself toward form and complexity, to develop and grow—and with growth to achieve increasing subjectivity—as it is for matter to move. Neither oscillation alone nor accident, neither mass alone nor motion, but rather development and the self-organization of substance (all theological qualifications aside) constitute the innermost properties of being that render a natural *history*, and evolution of reality, possible. Hence a cosmic drama, it could be argued, does exist that is "directed" not be a deity exogenous to it or by a

ing, "will narrow still more." Accordingly, Wilson, after having immersed us in a claw-and-fang social-Darwinism, in the very act of denying it rhetorically, opines that "we already know, to take two extreme examples, that the worlds of William Graham Summer, the absolute Social Darwinist, and Mikhail Bakunin, the anarchist, are biologically impossible. As the Social sciences mature into predictive disciplines, the permissible trajectories will not only diminish in number but our descendants will be able to sight farther along them."

These remarks, which essentially foreclose any creative social flexibility beyond the specious limits of a chromosome, are evidence of a totalitarian gall. They constitute a dogma of total surrender to social conditions as they are—social conditions, I would add, that are closer to social Darwinism today than in almost any period in humanity's bloody history. It is easy and rather superficial to criticize Wilson for his attempts to validate hierarchy, aggression, war, social domination, and conflict on biological grounds. These notions have been the flotsam-and-jetsam of sociology for decades. What renders Wilson's sociobiology particularly sinister is that it prostitutes the Hegelian notion (as vulgarized by Engels) that "freedom is the recognition of necessity" into a genic closure of all natural and social creativity. Wilson's "morality of the gene" is not only "selfish" but suffocatingly rigid; it not only impedes action with the autocracy of a genic tyrant, but closes the door to any action that is not biochemically defined by its own configuration. When freedom is nothing more than the recognition of necessity, when our expectations "narrow" as we discover the gene's tyranny over the greater totality of life, we are obliged to make the best of what we know we *cannot* do. *The possible becomes an expression of the impossible* just as Wilson's notion of reason is interpreted as a mere "epiphenomenon" of neurology.

If sociobiology has anything to offer, it is a very harsh conclusion: when knowledge becomes dogma (and few movements are more dogmatic than sociobiology), freedom is ulti-

mately denied. In Wilson's case, the freedom that is denied is not Summer's "absolute social-Darwinism" – for Summer's premises are built into sociobiology by definition, even as they are passingly rejected textually—but precisely the "extreme" which Wilson's singles out from all others: the anarchism of Mikhail Bakunin.

II

Our discussion of the reactionary content of sociobiology should not be permitted to conceal the problem it seeks to resolve. Biology, particularly in its relationship to society and ethics, has begun to acquire enormous, indeed highly controversial, importance. After a generation in which these two topics have been ruthlessly dissociated from one another by academics, the issue of *objective* ethical criteria and society's interface with nature—an issue forced upon us by ecology—has made the need for a new continuum between them an imperative of programmatic importance. Our "place in nature," to use Max Scheler's phrase, is no longer to be evoked in wistfully romantic verbiage. It has become a philosophical challenge to overcome the dualism we inherited from Hobbes, the moral relativism we inherited from Hume, and the notion of a "blind," "mute" mechanical nature we inherited from Galileo.

Tragically, the need for meeting these challenges and resolving them is not forced by sociobiology alone, with its simplistic crudities. Like all sweeping issues of any historical period, the relationship of society and ethics to nature has been burdened by serious ideological tensions which have one-sidedly warped almost every intellectual contestant. Genic reductionism, in fact, is merely the coarsest weed in a larger bouquet whose constituents are only slightly less crude than sociobiology. It is unfortunate to note that a gifted evolutionary theorist like Stephen Jay Gould, for example, has reacted so sharply to the

recent popularity of creationist theories of life that he denies any moral content to natural history. The temptation to react against one extreme, notably reborn Christianity, by evoking an equally questionable extreme like a mechanistic Darwinism, does no service to theories of biological evolution.

Mechanistic theories of evolution are as rooted in speculative prejudgments as creationism. By the same token, the shared failure of divine creationism and mechanistic evolutionism to resolve the moral and ecological problems created by our historic cleavage from nature has not been eliminated by infusing systems theory with a sovereign, all-encompassing importance—or worse, by surrounding it with a mystical halo borrowed from archaic, often quietistic Asian religious systems. The "California School of Mystics" if I may be permitted to so label writers like Fritjof Capra, Eruch Jantsch, and for the hovering ghost of Gregory Bateson, is redolent of a systems theory as unspiritual and reductionist as the very mechanism it purports to oppose. The lavish quotations from Taoist and Buddhist literature do not alter the fact that systems theory is as mechanistic as the Newtonian image of the world as a clock. Feedback loops—whether negative or (in the case of Manfred Eigen and Ilya Prigogine) positive—are ultimately rooted in the mass-energy casualties and mathematical formulations that nourished Cartesian-Newtonian mechanisms. We should not permit our newly acquired aversion to a means-end (or "linear") rationalism to cloak the fact that the "circular" rationalism of the California Mystics has simply replaced the clock with the radar set and the library with magnetic tapes. "Spaceship Earth" is still a spaceship, not a fecund, living planet that nourishes life.

Ultimately, it is not in oscillatory movements of feedback loops or an ill digested notion of form, "mentation," and "oneness" that a new ecological monism will be formulated. The recovery of the notion of "directiveness," which systems theory has brought to the foreground of natural and social evolution,