The recent controversy surrounding sociobiology has now quieted, but despite that, sociobiology’s influence has increased. The controversy began when Edward O. Wilson, Professor of Biology at Harvard University, published his *Sociobiology: The New Synthesis* amid great fanfare in 1975. It was a large book, some 600 pages, constituting an attempt to collect and integrate an enormous amount of data and theory regarding the social behavior of animals into a coherent whole. The book was immediately attacked by left-wing critics; articles appeared in *The New York Times* and *The New York Review of Books*, rallies were held on campuses while essays, articles, and books examined sociobiology seemingly from every side possible. Wilson was attacked mainly for having provided scientific respectability for the status quo and rational justification for racism, sexism, and classicism since his main point was that human social behavior has a strong genetic component, based on the evolutionary origin of human nature. Wilson responded by pointing out that his view of the proportionate influence of genetics on human behavior was in fact moderate, leaving much room for cultural influences, and by referring to the most vehement attacks on him as “academic vigilantism.”

In 1978, Wilson published *On Human Nature*, a much shorter and less rigorous book aimed at a popular audience. In this book he developed in detail his sociobiological view of human nature to which he had devoted only the last chapter of his earlier book. The latter book, in essence, presents a view of scientific materialism applied to human nature, giving an entirely reductive account of such phenomena as human sexuality, religion, and aggression. There is a development in both books from a scientific elaboration of animal behavior to a loose argument in favor of a reductivist view of man. *On Human Nature* is in fact the latest of a series of attempts to enclose the phenomena of man into an empirically determined, scientific rubric. Despite the claims of his left-wing critics, Wilson is not the heir of Galton and Spencer; he is the heir of Condorcet, Comte, Marx, Freud and Skinner.
As the latest writer in the context of the historical tradition of scientific materialism, Wilson's theory depends on a set of scientific discoveries which constitute the new major development of evolutionary biology, namely the extension of classical Darwinism from an explanation of the origin of the soma of organisms to an explanation of their social behavior. As an example, most species of the insect order hymenoptera, including bees, ants and wasps, show a marked social aptitude, with hundreds of insects living closely together in hives or nests. Their social life is based on a rigid caste system consisting usually of a fertile queen plus orders of sterile workers and soldiers. Each member of a caste has its ordained duty-egg-laying for the queen, insemination of the queen by short-lived males, grooming the queen, caring for eggs and pupae, food storing, defense, and discovery of food for the various members of the other castes. This results in a number of complex, mutually related activities dedicated to one overriding end: the preservation of the hive. All the social behavior of the tightly organized insect societies, seemingly so complex as to be an analog to human society, is determined almost exclusively by means of complex organic molecules called "pheromones." Communication happens largely by detection of traces of pheromones, the sterility of the lower castes is effected by a pheromone secreted by the queen, and the shape, size, caste characteristics, and growth stages of the hive members are also determined by known chemical processes. The chemical processes, while complex and only recently discovered, are yet simple enough to be understood in detail in the way that they determine the various types of social behavior of the insects. These discoveries fuel the hope that the social behavior of more complex beings, including man, can be understood in approximately the same way. Significantly, before he wrote Sociobiology and On Human Nature, Wilson was an entymologist and had written a book called Insect Societies. Naturally, the application of the same principles which satisfactorily explain the behavior of insects and even higher apes to the social behavior of human beings is far more problematic.

This essay will begin with a critical review of the recently published abridged, paperback edition of Wilson's Sociobiology (referred to in the text as "SBA" for "Sociobiology-abridged"), then present a summary of his On Human Nature (referred to in the text as "OHN"), followed by a critical analysis of OHN including some comments on sociobiology in general. The emphasis throughout will be to describe and criticize the effect of sociobiology on our understanding of the nature and behavior of human beings.
I. On Sociobiology: The Abridged Edition

The publication of an abridged paperback edition of Wilson’s *Sociobiology* attests both to the influence and length of the original. A shortened version shows its influence and popularity, for the abridgment was published with the express purpose of reaching a wide audience, “intended to serve both as a textbook and a semi-popular account of sociobiology” (SBA, v). Even the abridged version is long, consisting of three hundred pages of dense text, a glossary, an index, and a twenty-page bibliography. The bibliography lists over eight hundred works by more than six hundred authors, ranging from the notes of humble bird-watchers and the papers of bio-chemists to the books of mathematical geneticists. It includes works by Darwin and the major figures of several other fields, including no less than eighteen of Wilson’s own. The book is filled with diagrams and occasional mathematical formulas (concentrated in the earlier, theoretical chapters), and has a large number of well-drawn, scientifically exact illustrations of a variety of life forms performing typical social actions. Thus, even the abridged version gives an impression of solidity, exactness, and fulfilled intellectual promise.

SBA has twenty-six chapters organized into three main sections. “Part I. Social Evolution” lays out the basic definitions of sociobiology, then goes on to deal with its two main theoretical underpinnings, the biology of populations and the phenomenon social biologists call “altruism.” “Part II. Social Mechanisms” deals with the general movers of social behavior from an evolutionary point of view, which include group size, the evolutionary development of social behavior, communication, aggression and territoriality, casts and dominance systems, and sex and parenting. “Part III. The Social Species” gives a moderately detailed description of those species which have achieved a high degree of social development, i.e., the “colonial invertebrates” (primitive sea creatures that are one-celled and live in colonies that act as a single entity), the social insects (wasps, ants, bees and termites), cold-blooded vertebrates (fish, frogs and reptiles), birds, mammals, and man. Mankind gets a chapter to itself, entitled “Man: From Sociobiology to Sociology,” which is especially important for the purposes of this review and about which I will say more later.

SBA combines the latest evolutionary theory with detailed descriptions of the animal kingdom. It thus joins the new science of biology, which relies on chemistry and physics, with an older tradition of natural history, to give detail and comprehension to our understanding, enjoyment, and contemplation of nature. Wilson sees further purposes to his effort, however, for he hopes, first, that SBA as a *summa* or encyclopedia of research on animal behavior will establish sociobiology as a perma-
nent and recognized sub-field of science. In this manner, SBA and Sociobiology would fulfill the condition of a founding text of a scientific paradigm in the Kuhnian sense. But if Wilson sees sociobiology as a well-established scientific field, he also sees it as a field which has important reductive consequences. Thus, after noting that the combining of Darwinian evolution with Mendelian genetics in the 1950s resulted in what is called "the Modern Synthesis," Wilson states that "... sociology and the other social sciences, as well as the humanities, are the last branches of biology waiting to be included in the Modern Synthesis. One of the functions of sociobiology, then, is to reformulate the foundations of the social sciences in a way that draws these subjects into the Modern Synthesis" (SBA, 4). In Wilson's theory, Sociobiology is the field to which psychology, sociology, economics, art, and literature (the humanities) will be reduced. But as he says, "whether the social sciences can be truly biologicized in this fashion remains to be seen" (SBA, 4).

The Gene Pool Concept. Because the new field of sociobiology is founded on the two fundamental concepts of population biology and altruism, it will be helpful to comment on them, however briefly. Darwinian evolution depends on characteristics arising among members of species which differentiate them from other members, which are helpful in the struggle for existence, and which can be transmitted by the members to their offspring. Gerbils which are native to the North African desert have light colored coats, presumably because any gerbil ancestors which had darker coats were more easily spotted by predators and thus less likely to survive long enough to have offspring. "Fitness" in this case is the relatively simple property of coat color which has become a characteristic part of the gerbil species. Thus far, Darwinian evolution is easily understandable; what was not well understood by Darwin was the cause of somatic characteristics such as coat color, and their stability and difference through generations. After all, if a species is not an "essence" permanently fixed in nature, but rather a happenstance suite of advantageous somatic characteristics, as Darwinian theory implies, then the underlying cause of each separate characteristic becomes the critical explanatory point for the survival of the Darwinian theory.

That underlying cause was discovered by Mendel around 1870 and then rediscovered around the turn of the century. Genes are the biological causes of somatic characteristics and there are clear mathematical laws of genetic inheritance. At least two points complicate the matter. First, the laws of genetic inheritance are probabilistic, not deterministic; and secondly, most physical characteristics are controlled by more than one gene, e.g., the human face in which a mother's hair line and a father's eye color are but two components. Despite these and other corn-
plexities, individuals can be understood, in principle, simply as collections of his or her genes. One principal effect of the development of genetic theory is to strongly reinforce the tendency already present from evolutionary accounts of human nature to perceive man in a reductive way. The discovery of genes gives the reductive mentality something physical to grasp which explains with seemingly mathematical precision all the physical characteristics of any living organism including man, and yet which are themselves reducible to chemical formulas, albeit complex ones.

While genes themselves are true physical entities, inherently part of a living body and observable under high magnification, once identified they can be intellectually dissociated from the organisms in which they inhere. This abstractive process means that genes can be considered separate entities in themselves; and if individuals can be understood as merely their genes, then an entire population can be understood as an abstract collection of genes with the individuals left out. This "gene pool" concept underlies population biology, and is an essential aspect of contemporary evolutionary theory. The "population biology" that underlies Wilson's sociobiology is the study of gene pools, typically expressed in the form of mathematical equations, including such topics as the distribution of genetic characteristics, differential rates of birth and death, aging, reproduction, and population density. The precise definition that Wilson gives for evolution is "... a change in gene frequencies within populations from generation to generation." This shows how closely contemporary evolutionary theory is tied to the gene pool concept and the abstract study of populations, for it is the transformation of populations, defined not as collections of individuals but as collections of dissociated genes, that now constitutes, it is said, the process of organic evolution.

Altruism. One of the particular theoretical problems faced by Darwin was that certain individual organisms act in such a way as to bring danger and even death to themselves in order to aid other members of their species. If the actuating mechanism of evolution is the effort of each individual organism to survive, as Darwin said, then such acts of self-sacrifice contradict the notion of how organisms ought to act. (Actually, Darwin dealt with a somewhat different but more difficult case, namely the existence of whole castes of insects that cannot propagate themselves. [SBA, 56]) The obvious inference which Darwin made was that natural selection worked on the group level as well as on the individual level: that is, that an individual sometimes acted in such a way as to sacrifice itself on behalf of the kin group of which it was a member in order to increase the probability of the kin group's survival. Such an inference can easily be supported by observation of, among many possible exam-
pies, distraction displays in which adult birds display themselves in front of predators in order to lead them away from their young. As a result, current evolutionary thought now refers to acts which can either benefit the individual or the kin group as "kinship selection".

Nonetheless, the concept remained unclear until the application of genetics to evolutionary theory was completed by creating the "Modern Synthesis," for now the mother's act of self-sacrifice can be systematically interpreted in terms of genetic investment. In this interpretation, individuals who put themselves in danger in order to protect their kin are acting to insure the survival of the genes they and their kin hold in common. In the instance of a mother endangering herself, since each of the offspring contains one-half of her genes, her seemingly altruistic act is really a canny means of insuring the survival of one-half of her genes. However, if the mother were to act to protect a niece or a nephew, she would only be acting to protect one-fourth of her genes (the proportion of genes shared), and while she would then be motivated to act altruistically, she would put herself in proportionally less danger. This interpretation has literally been explained as a cost/benefit ratio in which the likelihood of an organism's acting altruistically is described as the ratio of the likelihood that an altruistic act will result in death divided by the degree of kinship (proportion of shared genes).

While this interpretation of altruism is conceptually clear and may appear to solve the difficulty that self-sacrificial acts among animals present to Darwinian theory, in fact it cannot cover all the numerous examples of altruistic acts performed by human beings. Thus, "kin-selection" has had to be extended beyond the limits of immediate genetic advantage to include the benefits of "reciprocal altruism," i.e., acts which benefit human beings who are not kin, and among whom the proportion of shared genes is relatively low. It is important to note, however, that altruism when extended to this level of generality can no longer be mathematically defined in terms of, for example, a cost/benefit ratio.

A peculiar difficulty for Darwinian theory raised by the cost/benefit analysis of altruistic acts is that it results in a confusion about the "target of selection." Darwin faced the difficulty posed by altruistic acts (and whole castes of "neuter insects" who could not propagate themselves) by inferring that selection took place on the social level in some cases, while apparently assuming that in most other cases it took place on the individual level (SBA, 56). Current evolutionary theory now admits that there are conflicts between individual survival and that of groups such as families and tribes (SBA, 62). Reduction to genes is supposed to resolve the conflicts between individual and group selection, but it cannot cope with the phenomena of human altruism beyond those acts which are of immediate benefit for the transmission of genes. Further, the introduc-
tion of genes adds another level of adaptation to that of the individual and the group, namely the gene conceived as the main actor in the drama of evolution, as seen in Wilson’s reference to "The Morality of the Gene" (SBA, 3-6) and Robert Triver’s book, *The Selfish Gene*. This results in three levels of evolutionary activity, but these competing targets of selection raise a serious difficulty for Darwinian theory, for there is no longer a uniform process of selection by which to predict or explain evolutionary phenomena. This would seem to seriously damage the credibility of Darwinian evolution as it is usually understood, based as it is on the notion that a uniform process of "natural selection" among individuals is the motor that drives evolution.

Having dealt with the conceptual basis of sociobiology in the first section of SBA, Wilson proceeds in the second section to describe the mechanisms which drive social evolution. Among these mechanisms, two are worthy of mention since Wilson directly applies them to human beings, namely aggression and social roles. In the chapter on aggression, Wilson asks, "Is aggression in man adaptive?" The question is significant because the answer indicates the degree to which aggression is genetically innate and "natural" to man. Wilson’s answer is moderate, an Aristotelian mean, as it were, between the view that a high level of aggression is innate in man as indicated by our long history of warfare and cannibalism, and the view that aggression is either purely culturally induced or a result of neurosis (SBA, 126). After noting that aggression is "widespread and easily invoked" in man, Wilson states that "... overt aggressiveness is not a trait in all or even a majority of human cultures" (SBA, 126). To what extent then is aggressiveness innate and therefore adaptive in man?

Wilson strikes a subtle position, stating that aggression is evoked under "certain conditions of stress" (SBA, 126) including food shortage and high population density. He fineses the objection that aggression is a learned response by pointing out that the capacity to learn behavioral responses is genetically controlled and therefore adaptive (SBA, 126). Aggression appears in a variety of forms, some of them bizarre, especially in high density situations such as prisoner-of-war camps. Wilson proposes that the entire pattern of aggressive response is adaptive, varying according to the conditions that evoke it, and concludes by saying that in order to reduce human aggressiveness and increase personal happiness, we should redesign our social systems and control population density so as to make aggressive responses inappropriate and less adaptive. Interestingly, Wilson’s entire discussion deals with human aggression only in general biological terms, having nothing to say about why some individuals may act aggressively and others not, or about
peculiarly human forms of aggression such as criminal assaults and organized warfare.

Wilson's discussion of roles in human society (SBA, 154) comes at the end of a chapter which is chiefly devoted to roles and castes in insect societies but includes a survey of roles in vertebrate societies as well. Given the paucity of roles that occurs among animals even in chimpanzee societies, and given that castes among insects are chemically determined in response to ecological conditions, there is very little in the prior discussions which applies to human society. Contrasted to the higher apes, "[t]he very poverty and vagueness of roles in nonhuman primate societies underscores their richness and importance in human behavior." Contrasted to the physiological determination of division of labor in insect societies, division of labor in human societies "is based among trade-offs among individuals playing roles," a far more complex psychological process of projection and estimation (SBA, 154). "Human societies are therefore unique in a qualitative sense," Wilson concludes (SBA, 154, italics added). But the uniqueness of human societies creates a dilemma, for the human intellect underlies the capacity for advanced social organization: was intelligence evolved first, causing advanced social development, "[o]r was it the other way around-intelligence constructed piece by piece as an enabling device to create the qualities?" (SBA, 154). Wilson defers further discussion until the last chapter on man. In whatever way Wilson answers the question, however, one primary fact remains, his admission that in the matter of roles and castes, and by implication in other important ways as well, human society is unique and cannot be explained using the same principles used to explain the activities of insects and animals.

The final chapter, "Man: From Sociobiology to Sociology," deals with the human race, and has attained fame and some notoriety. (SBA reprints the unabridged version as it appears in Sociobiology, only in the latter it is chapter 27 while in SBA it is chapter 26.) In this chapter, Wilson applies all the foregoing socio-biological theory and empirical description to a variety of topics concerning the human race-twelve to be exact-ranging from the plasticity of human social organization, to communication, to the causes of advanced social evolution.

Throughout the entire chapter, two major tendencies of Wilson's thought are apparent as he treats each topic. First, Wilson carefully distinguishes, as far as he is able, the degree of genetic determination that applies, varying it from topic to topic as the evidence allows. Two examples can represent the extremes: human communication is so complex as to be simply "unique" in the animal kingdom, while warfare and tribalism are direct evidence of our primate and animal ancestry (SBA, 280, 289-90). Wilson goes so far as to provide charts which show the de-
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degree to which characteristics are either unique to the human species or are shared with primates and vertebrates (SBA, 276, 293). It is important to note that for Wilson genetic indetermination of a particular characteristic does not mean that it is random and thereby beyond the scope of evolutionary process; such indeterminateness only means that the evolutionary process is transposed to another level, albeit one in which more variability is apparent. Thus, he refers to culture as an evolutionary tracking device (SBA, 284) and gives an overly brief but entirely reductive account of religion, explaining it in terms of individual and social survival (SBA, 285-87). It is also important to note that Wilson relies on cultural anthropology, not genetics, to assess the degree of genetic influence that applies to a given human characteristic, i.e., how much of a human trait comes from animal ancestry. But the assessments of cultural anthropology are based on the observation and comparison of gross cultural characteristics, not on the chemical components of specific genes, and are far less likely to be as accurate since such observations and comparisons will be colored by preexisting beliefs held by the observer, a point which has not been missed by Wilson's left-wing critics.

The second tendency apparent in Wilson's treatment of the human race is the total exclusion of mind or purpose to explain human social behavior. Further, this tendency is a reflection of an exclusion which characterizes his treatment of all animal social behavior, a neglect criticized by the late geneticist C.H. Waddington in his review of Sociobiology as "the weakest feature in the whole grand structure which Wilson has built up. . . . Is it not surprising," Waddington asks, "that in a book of 700 large pages about social behavior, there is no explicit mention whatever of mentality?" After quoting a passage from Sociobiology which describes the distraction display of a certain bird species which fakes an elaborate death to draw predators away from its nest, Waddington asks further, "[clan there be any point in renouncing the use of words like mind, or goal-seeking, in the face of phenomena of this kind?"

If the exclusion of mind amounts to a neglect in Wilson's account of animal behavior, it amounts to distortion in his account of human behavior. One result is that those human characteristics which Wilson says are "unique," such as communication and roles, cannot be adequately explained sociobiologically, precisely because the element that makes them unique, i.e., mankind's possession of an intelligence by which to understand symbols and project purpose, is denied. Among the examples of human uniqueness, however, one in particular stands out. In the

chapter on man, Wilson must account for the later social evolution of the human race, the transformation of mankind from a being that was barely indistinguishable from an upright walking ape to the creator of advanced civilization in just ten thousand years, an extremely short span on the evolutionary time scale. As Wilson puts the problem, "[b]iological parameters usually change in a rate-dependent manner to slow growth and eventually bring it to a halt. But almost miraculously, this has not yet happened in human evolution" (SBA, 296). What might explain later human social development which since 1400 A.D. in Europe has expanded "not just exponentially, but super-exponentially" (SBA, 296)? Wilson cites five causes, including sexual selection, multiplier effects in cultural innovation, agriculture combined with increased population density, warfare, and "multifactorial systems," i.e., the joint effect of the foregoing four causes (SBA, 297-99). While Wilson assumes that intelligence has continued to evolve during this process (SBA, 296), he nowhere cites human intelligence or the development of mental capacity as indicated by the exceptional size of the human brain as a cause. Indeed, he seems to deny it when he states that there is "no reason to believe that during this final spurt [of human social development] there has been a cessation in the evolution of either mental capacity or the predilection toward special social behaviors ... it would be false to assume that modern civilizations have been built entirely on capital accumulated during the long haul of the Pleistocene" (SBA, 296, 297). In other words, intelligence and the mind are an effect of social evolution, gradually increasing along with it, rather than a cause, although Wilson admits, "we do not know how much mental evolution has actually occurred" (SBA, 296). Wilson does not explain that mental evolution at such a rate is as inexplicable as the social evolution that he supposes caused it, and for which he can only suggest possible causes, the intellect not among them. But why not posit mental evolution as at least a possible cause of what Wilson admits are inexplicably unique social characteristics among humans such as communications and roles? The only answer can be a prejudice on Wilson's part against mentality, intelligence, and mind, as such.

The original edition of Sociobiology was published in 1975 by Harvard University Press, who released it with exceptional publicity. As is well known, both the book and Wilson himself have become the subjects of vehement and sustained attacks from critics, mostly on the left, who see sociobiology as not just another biological determinism, but one which validates the inherent inequities of established social structure by attributing them to unchangeable human nature and by covertly making
the descriptive into the prescriptive. The reason for the attack from the left is that it fears current biology as it once feared classical economics and for the same reason: biology implies there are objective scientific laws which severely limit the degree to which social structure can be changed to accommodate egalitarian prescriptions. For the same reason, observers on the right have welcomed sociobiology, as indicated by the highly approbative passage in Paul Johnson’s recent book, Modern Times. In general, however, there has been far less approval from the right than criticism from the left, and no one on the right has dealt with Wilson’s evident materialism and its effects on standards of social value.

There has been a positive and non-political response to Wilson’s attempt to establish sociobiology as a paradigm, namely an increased reliance on biology in the social sciences. There are a variety of manifestations of this trend, not all of them directly attributable to Wilson’s influence, including a number of essays, articles, reviews and books. An example is a volume entitled Biology and the Social Sciences which is a collection of essays with titles like “Culture and Sociobiology,” “Human Behavior and the Behavior of Animals,” and “Economics from a Biological Viewpoint.” (Not everyone is enthusiastic, however, as in an essay entitled “The Social Sciences Cannot Be Unified with Biology” by Charles Frankel.) Perhaps the most significant indication of the trend is the establishment of the “Association for Politics and the Life Sciences” which has its own journal and which has organized sessions at both the national and some regional meetings of the American Political Science Association.

**IL Summary of On Human Nature**

*On Human Nature* is the third book in a trilogy, although not originally intended as such, written by Wilson following *The Insect Societies*

2. See in Caplan, ibid. the selections by Elizabeth Allen et al., the Sociobiology Study Group, Stephen Gould, and Richard Burian for left-wing critiques. For a methodological left-wing attack on a variety of aspects of contemporary biology, see Not In Our Genes, R.C. Lewontin, Steven Rose, and Leon Kamin (New York: Pantheon, 1984).


5. The journal of the Association for Politics and the Life Sciences is Politics and the Life Sciences, ed. Thomas C. Weigele, DeKalb, Ill.: Northern Illinois University.
published in 1971 and *Sociobiology* in 1975. Wilson explains that in the final chapter of *The Insect Societies*, "... I suggested that the same principles of population biology and comparative zoology that worked so well in explaining the rigid system of the social insects could be applied point by point to vertebrate animals (OHN, ix). Wilson followed up his own suggestion by doing the research for and writing *Sociobiology* in the final chapter of which, he says, "I argued that the biological principles which appear to be working reasonably well for animals in general can be extended profitably to the social sciences. I became more persuaded than ever that the time has at last arrived to close the famous gap between the two cultures, and that general sociobiology . . . is the appropriate instrument for the effort. *On Human Nature* is an exploration of that thesis" (OHN, x).

Unlike *The Insect Societies* and *Sociobiology*, OHN is both popular and speculative, an effort to extend evolutionary theory to "all aspects of human existence" and, as such, an argument on behalf of scientific materialism (OHN, x). Therefore, Wilson says, OHN "... is not a work of science; it is a work about science, and about how far the natural sciences can penetrate into human behavior before they will be transformed into something new" (OHN, x). The book has nine chapters, but in effect two main sections plus an introduction and a conclusion. The first section consists of three chapters-"Heredity," "Development," and "Convergence"-which present the basic theory of sociobiology in a popular manner as it relates to human nature. The second section consists of four chapters-"Aggression," "Sex," "Altruism," and "Religion"-each of which deals with a particular aspect of human nature. *On Human Nature* is well written, its style expressive and lively, and its arguments seriously marshalled to show Wilson's reductive techniques in full flower as he explains all aspects of human nature from a scientific point of view. It is noteworthy that OHN won the Pulitzer Prize for nonfiction in 1979.

The first chapter of OHN, "Dilemma" (all the chapters in OHN have single nouns as titles), introduces the main tenet of Wilson's book with admirable clarity; that science can fully explain the origin and activities of the human mind, that the human race came about by Darwinian natural selection, and that, therefore, "... environmental necessity, not God, made the species" (OHN, 1). Two significant and broad consequences follow from the principle of evolutionary naturalism, which Wilson presents in the form of two dilemmas. The first dilemma is that all species, and therefore the human species, "... lack any immanent purpose or guidance from beyond their immediate environment or even an evolutionary goal...." (OHN, 2). Human reason is a biological device for human survival rather than a means of reaching the truth about ob-
jective reality (OHN, 2, 3). The social consequence of this first dilemma is, "... the rapid dissolution of transcendental goals toward which societies can organize their energies" (OHN, 4). The second dilemma arises from the fact that the origin and meaning of human values are now discoverable by means of scientific investigation. The ethical precepts propounded by philosophers, for example, Rawls and Nozick, originate "... in the deep emotional centers of the brain, most probably within the limbic system" (OHN, 6), since ethical practices are in fact based on emotion, and both precepts and emotion are the results of a long-term process of natural selection. Thus, the second dilemma is which of the censors and motivators of human behavior that have arisen by evolution ought to be obeyed, and which suppressed? (OHN, 6).

The resolution of the second dilemma which is, in effect, the transposition of ethics to an evolutionary frame of reference, must be the work of empirical science, Wilson states, no matter how reluctant people may be to accept this reduction of the commands of ethics to the necessities of biology. Wilson explains reduction in terms of "anti-disciplines" set up against the disciplines which are to be reduced to the terms of the antidisciplines; for example, many-body physics is the anti-discipline of chemistry. While the relationship between the discipline and the anti-discipline is tense at first, it later becomes fruitful and complementary. Thus, Wilson sees the "blending of biology and the social sciences" (OHN, 10) as overcoming the gulf between the two cultures of science and the humanities. The reduction of a discipline to an anti-discipline affects both in the end, so that the coming blending will result in the absorption of "the relevant ideas of biology" by the social sciences, whose content is "potentially far richer" (OHN, 10).

In Chapter 2, "Heredity," Wilson shows the closer-than-suspected relationship that exists between human beings and the rest of the animal kingdom, based on genetic descent. At 37 pages, it is the longest chapter in the book, as Wilson apparently thinks that he must make his case in detail against a certain resistance he anticipates in the reader. More precisely, since Wilson makes the case that human social behavior is largely genetically determined, he must be ready to challenge the notion that culture is the prime determinate of social behavior. It is a misconception among many of the more traditional Marxists, some learning theorists, and a still surprising proportion of anthropologists and sociologists that social behavior can be shaped into virtually any form" (OHN, 18). In reality, each person's behavior, says Wilson, is the result of the interaction of his genes with his cultural environment.

The proof of Wilson's assertion is the burden of sociobiology, which he characterizes as a "hybrid discipline that incorporates knowledge from ethology ... ecology ... and genetics in order to derive general
principles concerning the biological properties of entire societies" (OHN, 16). "Sociobiology is a subject based largely on comparison of social species" (OHN, 17), and therefore to make his case about the animality of human nature Wilson makes point by point comparisons between human behavior and the social behavior of primates, especially chimpanzees (OHN, 20-32). Wilson considers the objection that evident resemblance in social behavior can be explained as accidental, i.e., that the same kinds of behaviors shared by animals and man may have genetic causes among animals, but cultural causes among humans. Wilson offers two examples to prove that the genetic explanation is the correct one, incest taboos and hypergamy, "the female practice of marrying men of equal or greater wealth and status." Wilson shows how these practices in human societies, even in bizarre forms, are the result of an inherited predisposition to maximize the number of offspring in competition with other members of the society" (OHN, 40). Further evidence comes from the example of mentally retarded people, some of whom lose all culturally induced behavior patterns while retaining instinctive, mammalian forms of behavior, which shows the existence of a biological substrate to human behavior.

Having made his case for a common pattern of human social behavior that is biological in character, Wilson goes on to consider "the important but delicate question of how much social behavior varies within the human species" (OHN, 42), i.e., how much group and individual characteristics are influenced by genes. After considering instances of the effect of genetic variability on human behavior including XXY criminality and studies of identical twins, Wilson concludes that human beings are a "conventional animal species" in this regard. He adds, "[i]f the comparison is correct, the psychic unity of mankind has been reduced in status from a dogma to a testable hypothesis" (OHN, 47). Wilson lastly treats of human racial differences, which he finds depend only somewhat on genes, but far more on "learning and social conditioning than on heredity" (OHN, 48). Despite group and racial differences, the overwhelmingly significant fact is that of the biological basis of our common human nature, for "... mankind viewed over many generations shares a single human nature within which relatively minor hereditary influences recycle through ever changing patterns..." (OHN, 50).

In Chapter 3, "Development," Wilson considers how the genetic inheritance of the human race directs the development of the behavior of an individual human being. He argues for a genetic determinism, but one that is complex enough to account for the difference between the behavior of human beings and that of, e.g., mosquitoes. The difference being that while the mosquito is an "automaton, the channels of human mental development are "circuitous and variable" since "human genes
prescribe the capacity to develop a certain array of traits” (OHN, 56). While some human behavioral traits are severely restricted, e.g., left and right handedness, more complex phenomena are not, the genetic influence pre-determining a capacity in which the final outcome is a range of possibilities depending upon which of a wide variety of channels the incipient behavior rolls into. In his explanation of individual human development, Wilson relies on a metaphor, that of a ball rolling down a grooved embankment; if the bank is steep and the grooves deep, the course of the ball is swift and pre-determined; if the bank is flat and the grooves shallow, or if a single groove branches out into two or more grooves, the course of the ball is slow or unpredictable or both. Language development in humans combines both kinds of topography; language learning in infancy and early childhood is the “upper slope in the developmental field of language . . . deeply canalized terrain” (OHN, 63, 64). Later adult language learning, however, is a “shallowly etched network that ramifies in many directions” (OHN, 69), which is mostly influenced by cultural evolution rather than by genes.

Wilson considers learning theory in the last part of the chapter, asking first what in reality corresponds to the metaphorical ridges and channels of development. His answer is hormones and other chemicals which affect the nervous system, but also the more “distantly removed” learning rules implanted in the nerve cells. In opposition to Skinner’s environmentalism which Wilson says is very influential, he cites Piaget’s “genetic epistemology” in which learning takes place in generally observable growth stages and Kohlberg’s application of this growth concept to the moral development of human beings. “Particularities in decision-making distinguish one human being from another. But the rules followed are tight enough to produce a broad overlap in the decisions taken by all individuals and hence a convergence powerful enough to be labelled human nature,” Wilson explains (OHN, 67). The stages which all human beings follow in their learning development are evolutionary in origin, as is the reliance on emotion in decision-making. Thus, human learning is primed; the human mind is not a tabula rasa.

In Chapter 4, “Emergence,” Wilson considers the biological origins of human culture, treating a variety of different topics in a manner which is sometimes confusing. The primary theoretical problem he deals with is explaining the vast gulf between the characteristics of animal societies and those of advanced human civilizations in exclusively biological terms. He spends the first third of this chapter dealing with human personality in the classic terms of freedom of the will and the status of mind, using a reductive approach. Of the will he says that while our actions are determined, that the human mind is unable to grasp all the variables at one time that influence a complex instance of human behavior; to that
extent, the will is free. Of the mind, he says that *intention* is the chief mystery for neurobiology, and that both an overly mechanistic and a vitalist explanation of mind are to be rejected; Wilson speculates that the mind is best seen as a set of "schemata" or "plans" (resembling Gestalts?) which predispose our understanding into patterns of thought and our behavior into patterns of action (OHN, 75). Also, "schemata in the brain could serve as the physical basis of will" (OHN, 76).

Despite our inability to predict individual human behavior in detail, in principle the "statistical behavior" of human societies is predictable (OHN, 78). Biological evolution which is "Darwinian" gives way to cultural evolution which is "Lamarckian" at a crucial point in the development of human culture. Despite this, Wilson is not ready to concede an interactionism among equals of biology and culture, for he spends the second third of this chapter showing that the divergences between biological evolution and social change are not "too great, because ultimately the social environment created by cultural evolution will be tracked by biological natural selection" (OHN, 79). The failure of slavery, Wilson claims, is proof of the biological constraints on culture, as slave systems fail because the masters cannot break the mammalian and human traits of the slaves toward, for example, family life. The life-style of primitive hunter-gatherers also shows the existence of innate mammalian constraints in family structure, child rearing, sexual division of labor and patterns of aggression.

Wilson's basic model for the origin of human social behavior is that of *autocatalysis*, a term from chemistry which denotes a process that increases in speed according to the amount of the product it has created (OHN, 84). This metaphor is used to explain the very rapid expansion of human culture in the last 10,000 years, which "almost miraculously" has not yet tapered off. Wilson notes the rapid development of brain size in human homonid ancestors, but states that the key to the emergence of human civilization is *hypertrophy*, defined as "the extreme growth of pre-existing structures" (OHN, 89). Just as the teeth of the baby elephant grow into the tusks of the adult, so "the basic social responses of the hunter-gatherers have metamorphosed from relatively modest environmental adaptations into unexpectedly elaborate, even monstrous forms in more advanced societies" (OHN, 89). Thus, the relatively weak form of male domination of women that exists in primitive societies increases as society evolves into more complex forms. Other bizarre forms of social behavior are explained this way, including cannibalism; however, the most significant example of hypertrophic development is the gathering and sharing of knowledge.

Having spent the prior three chapters making the case for sociobiology in general, Wilson proceeds in the following four to deal with "four
of the elemental categories of behavior, aggression, sex, altruism, and religion, on the basis of sociobiological theory" (OHN, 97). Wilson does not explain why he chose these four behavioral categories rather than others, such as castes and class distinctions, government, or science and learning which are equally broad and as arguably influenced by our mammalian ancestry.

Chapter Five, "Aggression," makes the by now predictable case that despite the claims of cultural environmentalists and those disposed to a hopeful view of human nature, the tendency to aggression is innate in human nature. However, Wilson qualifies this assertion, developing throughout this chapter a complex and hopeful view about human aggression and war which closely reflects his account in SBA. While aggression is innate and can manifest itself in even the most pacific of cultures, it is also "one of the genetically most labile of all traits" (OHN, 102) which is displayed in a scale of behavioral responses that appear or disappear according to particular circumstances (OHN, 101). Further, the history of the human species is not as blood drenched as some have asserted, and most kinds of aggressive behavior among members of the same species, including man, is a "density dependent factor," i.e., aggression typically occurring as a response to overcrowding (OHN, 105). Violent acts among men are not the bursting of a dam of inhibition (the "drive-discharge model"), but are largely shaped by culture (OHN, 105). Thus, Wilson develops an interactive view in which the particular forms of aggression are culturally influenced, but in which the general aggressive drive is innate and evolutionary in origin.

Human behavior is territorial, a trait shared generally with all other animals, which manifests itself among humans both in primitive tribes and in advanced industrial cultures such as the United States, as seen in the practice of respecting property rights. There is a constraint on territorial behavior, for it only arises when a resource is "economically defensible." The force behind most warlike policies is ethnocentrism which divides the social universe into kin, to whom exaggerated allegiance is shown, and enemies, who are seen as frightful and subhuman.

Wilson develops an account of war which ranges from its origins in primitive tribes where the evolutionary constraints are most apparent, to a commentary on the likely future of war in contemporary advanced society. The warfare of Brazilian headhunter tribes can be explained best, says Wilson, as a cultural tradition which evolved by "selective retention of traits that increase the inclusive genetic fitness of human beings" (OHN, 112). Despite the Darwinian advantage of their policy of warfare, however, the headhunters invented an account based on myth and religion rather than a scientific understanding of their place in the
jungle’s ecology. Aggressive cultures have three determinants which work at three levels-biological, environmental, and "the accidental details that contribute to cultural drift" (OHN, 116). "The practice of war is a straightforward example of a hypertrophied biological predisposition," but war is preventable, for "the full evolution of warfare can be reversed ..." (OHN, 117). Today, the threat of mutual destruction prevents recourse to war, for "the learning rules of violent aggression are obsolete." Pacifism should be a good, expressed in political science and diplomacy, as culture and politics weave a "confusion of cross-binding loyalties" that will reduce the chances of future wars (OHN, 120).

Wilson begins Chapter 6, "Sex," by denying that the primary functions of sex are either reproduction or pleasure. The reason for the evolution of sex, as opposed to monogenesis, Wilson says, is to create genetic diversity, for a simple division of the organism would result in an offspring which had the exact same genetic and hence physical characteristics. The reason there are just two sexes is that it permits "the most efficient possible division of labor" (OHN, 123). The distinction between sexes is based on the difference between the egg and the sperm; since females produce far fewer eggs than males produce sperm cells, the female has a greater "investment" in sex.

Although sexuality would seem to be the most biologically constrained of human activities, Wilson, again apparently anticipating resistance among his readers, devotes a good deal of space detailing the degree to which sexuality is biologically ordered. The point is especially important because variation in sexual mores and in the division of labor between sexes among the thousands of human cultures is enormous. However, even though the variation "is based on culture . . . [n]evertheless, this flexibility is not endless . . ." (OHN, 125) as Wilson proceeds to demonstrate, citing a series of examples, including polygeny, anatomy and temperament. Other indications that sex differences are at base genetically determined can be found from the study of the !Kung tribe and hermaphroditism.

Remarkably, Wilson summarizes this evidence in a minimalist manner, characterizing the biological determination of sex roles as a twig "bent a little bit," as "not entirely an accident of cultural evolution," and as a "slight biological component" (OHN, 132). However, the biological determination of gender roles is a fact, which leaves three options for public policy: (1) exaggerate the sexual differences in behavior, (2) eliminate all sexual differences, or (3) provide equal opportunities and access but take no further action (OHN, 132-33). Wilson appears not so much to favor the third option as to accept its inevitability, since (1) the first two options are likely to involve higher social costs and (2) the Kibbutz experiment showed the failure of the second option. Wilson obviously
anticipates a pro-feminist response to the genetic determination of sex roles, calling it "one of the most inconvenient and senseless" relics of our prior genetic history (OHN, 135).

Wilson comments on several related topics in the final eleven pages of the chapter on sex, explaining the persistence of the family and the difference between human and animal sexuality in terms of their evolutionary origins in which the lack of estrus in human females plays a large role, the nearly constant availability of copulatory contact serving to bond couples together over a long-term period (OHN, 140-41). Wilson attacks the Judeo-Christian view of human sexuality, stating that the "biological significance of sex has been misinterpreted by the theoreticians [sic] of Judaism and Christianity" (OHN, 141-42), and maintains that homosexuality may well have a genetic and hence evolutionary basis as a form of kin selection (in effect, that homosexuality works to the adaptive benefit of the homosexual’s siblings, nieces and nephews).

In the chapters on aggression and sex, Wilson dealt with characteristics that humans share with animals: in the next two chapters, on altruism and religion, Wilson will deal with characteristics commonly thought to divide humans from the animals. His tactics of argumentation will remain the same however, i.e., reduction, by showing the biological bases of what are supposedly distinctively human traits, but he will have to extend the range of his sociobiological principles farther. Despite this, he will be less tentative in reaching his conclusions, perhaps to make up for the lack of empirical evidence, and he will show far less sensitivity to the sentiments of religious believers, for example, than to those of feminists and pacifists. These tendencies are well represented by the provocative title of one of Wilson’s previously published essays whose argument is recapitulated in Chapter 7, "Human Decency is Animal."

Wilson begins Chapter 7, "Altruism" by considering the most extreme example of human self-sacrifice, that of giving up one’s life for another human being. This behavior is not unique to human beings, however, as in the example of bees whose stinger attacks result in their own deaths. This and other animal examples are resolvable as forms of kin selection; can human examples also be explained in biological terms? Wilson’s answer is yes: while granting "that the form or intensity of altruistic acts are to a large extent culturally determined, the underlying emotion, powerfully manifested in virtually all human societies, is what is considered to evolve through genes" (OHN, 153). However, while human altruism is genetically based, it is also always self-serving to some degree, conforming "to the best interests of self, family, and allies of the moment" (OHN, 153). Thus, human altruism, not fully corresponding to cultural or biological determination, but also to perceived self-interest,
is complicated, a "puzzle," and the best way to resolve it is to distinguish, Wilson says, between "hard-core" and "soft-core" forms of altruism (OHN, 155).

Hard-core altruism is "irrational," directed at others with no expectation of return, having evolved through kin selection. Soft-core altruism, on the other hand, is ultimately selfish, calculated to elicit altruistic acts in return. Most altruistic human behavior is soft-core not hard-core, which enables human society to exist in all its complexity, since hard-core altruism is aimed at the good of kin relations, family or tribe as opposed to the good of the general society (OHN, 157). Human behavior, guided by evolutionary constraints, is totally aimed at neither the survival of the individual or the survival of the group, but somewhere in between. Egocentrism, for example, takes precedence in human behavior even over racial identity, an example of the variability of soft-core altruism, of how, that is, allegiances are strongly held, yet shift from one object to another. "It is exquisitely human to make spiritual commitments that are absolute to the very moment that they are broken" (OHN, 164). But this is for the good, for it enables a flawed capacity for a social contract . . . [and] . . . optimistic cynicism with which rational people can accomplish a great deal" (OHN, 164). The great counter-example which Wilson considers is sainthood in the person of Mother Teresa, which he explains as simply the hypertrophy of the altruistic impulse, albeit one so extreme that he calls it "ossification" (OHN, 166).

In Chapter 8, "Religion," Wilson states that he faces his greatest challenge in his attempt to explain the major features of human social existence sociobiologically. The chapter itself reflects this, as it deals briefly with a variety of topics, not always in an organized way. Not only is religion "the most complex and powerful force in the human mind" (OHN, 169), it is also far removed from the main principles of sociobiological explanation, based as they are, on "population biology and experimental studies in lower animals" (OHN, 175). Further, religious motivation is probably "hidden from the conscious mind" because religion is, above all, "the process by which individuals are persuaded to subordinate their immediate self-interest to the interests of the group" (OHN, 176). Despite this fact, and despite the persistence of religious belief in the face of modern scientific progress, the seeming paradoxes of religious belief can eventually be explained "if we pay due attention to the sociobiology of religion" (OHN, 172).

Sociobiologically, religion is a form of natural selection which operates on three levels-ecclesiastical, ecological and genetic, by which religious practices enhance the chance of survival and of procreation by adherents (OHN, 177). The evolutionary effects of religious practices take many generations to appear, but do ultimately affect the gene pool.
Wilson uses his version of gene-culture interactionism to explain a succession of religious topics, including ritual, witchcraft, communism as a form of religion, and cults.

The chief effect of religion is the willing subordination of the self to the group, which has benefits for both the individual and the group. There are tensions implicit in the practice of religion, however, for as Bergson noted, religion provides arbitrary social codes which counteract the extreme forms of individual identification with family. (Wilson provides a brief glimpse of a dialectical theory of religious history, in which the arbitrariness of religiously sanctified social codes forces individual rebellion and religious reform movements. [OHN, 1861) Harsh religious codes operate at the level of group selection, promoting the survival of the group, yet Darwinian selection operates on the level of individual selection. However, group and individual selection need not be mutually exclusive, for the average individual gambles that subordination to the religiously defined group will ultimately benefit him. The principle advantage of religious belief for the individual is the strengthening of his own sense of identity. This "sacralization of identity" (OHN, 188) predisposes the mind-"one can speculate that the learning rules are physiologically programmed" (OHN, 188)-to a few steps"which in combination generate the institution of organized religion" (OHN, 188), the steps being objectification, commitment and myth.

The last step appears especially important since men "would rather believe than know" (OHN, 177). In fact, "human beings are still largely ruled by myth" (OHN, 190). Among the disposable myths is the God of monotheistic religion who is always male, and who is always found among the beliefs of pastoral societies where herding and the figure of the shepherd are the primary features (OHN, 190). Another disposable myth is Marxism which masquerades as a form of scientific materialism but is not, since it rests on untested premises, principally the notion that human behavior is unstructured and can be molded by social environment. "Marxism is sociobiology without the biology" (OHN, 191). The three foremost myths today are religion, Marxism and scientific materialism in the form of the evolutionary epic. Marxism is passe. Religion is still strong, but can be explained by scientific materialism which is the myth that will prevail, even though "it suggests only an existential meaning for the human species" (OHN, 193).

The final chapter entitled "Hope" is a coda to the argument of the book, dealing with the general questions of mind, value and human nature as the consequences of Wilson's brand of evolutionary materialism. Wilson begins by harking back to the dilemma mentioned in the first chapter which referred to the denial of ultimate meaning for human exis-
tence by science. Wilson says that the circularity of the human predicament can be broken "through an exercise of will" (OHN, 196) to fashion a "biology of ethics" (OHN, 196). Wilson proposes a new set of values based on the cardinal value of the survival of the human gene pool, for the individual is "an evanescent combination of genes drawn from this pool . . . (OHN, 197). Diversity of the gene pool must be maintained, but also "universal human rights" (OHN, 198) which Wilson sees as a mammalian imperative as mammals strive first for their own individual reproductive success and only secondarily for that of their kin. Myth and values have a neurophysiological origin which makes them primarily emotional in nature, but scientific training can help us combine rationality with emotion in their outcome.

"The core of scientific materialism is the evolutionary epic," says Wilson (OHN, 201), but it is also a myth whose most sweeping assertions cannot therefore be proven with finality. It remains however the best myth we are ever likely to have, since it is "as close to the truth as the human mind is constructed to judge the truth" (OHN, 201). Wilson contends that science will overcome religion and is annoyed that the high culture of Western civilization ignores sociobiology, writers and thinkers not realizing its importance and value (OHN, 203). Ultimately, science and the humanities will meet in the manner of an anti-discipline and a discipline so that as science becomes a stimulus to the imagination, it will come to replace religious belief. Human history can be changed because we now have the power to re-program our genes and hence the biological basis of our social behavior.

III. Criticism of On Human Nature

Materialism

The first thing to be said about Wilson’s On Human Nature is that, unlike his earlier books, Insect Societies and Sociobiology, it is not a work of scientific synthesis, but rather a speculative essay in scientific materialism which attempts to explain all aspects of human existence in terms of evolutionary biology. The second thing to be said about it is that On Human Nature is torn between two contradictory pulls, the attempt to explain all aspects, especially social aspects, of human existence biologically, and the attempt to satisfy wherever possible within the boundaries of biological determinism, the left-wing expectations of Wilson’s presumptive audience. The strain produced by these two pulls, often acting in opposing directions, can be seen in Wilson’s treatment of such controversial topics as gender roles and the genetic influence on intelligence. The third thing to be said about On Human Nature is that it
fails on two main counts, for it does not successfully bridge the gap between biological determinism and the cultural indeterminism sought by the Left. Further, scientific materialism is not new and the objections to it are well known; the implicit hope of Wilson’s essay is that the recent discoveries of sociobiology would be enough to overcome them, but they are not. Wilson provides explanations of mind, free will, values, religion and the course of human progress based on the “evolutionary epic” as updated by recent discoveries in genetics and ethology. Yet the origins and workings of human social development remain as mysterious to him as to Lucretius who explained free will by the “swerve” of atoms or Hobbes who invented a calculus to explain human desires or Skinner who denied the existence of the human mind.

Wilson does acknowledge the inevitable dilemma in his position, that scientific materialism cannot provide a transcendent purpose for mankind to pursue or by which to judge its actions or control its desires, a ramification that leads him into a vulgar Existentialism, for quotes from Camus both begin and end *Sociobiology*. Interestingly, Stephen Gould, in an article on the sociobiology of altruism entitled “So Cleverly Kind an Animal,” approvingly cites these words of Simone de Beauvoir. “The essence of man is that he is the being that has no essence,” the poverty of modern thought thus expressed in the contradictory vocabulary of classical metaphysics. That Existentialism and the latest developments of biological science have the same implication for our view of the human person may seem odd, yet the cause and the effect are the same. The cause is the denial of known purpose as a part of human life, either because of a sense of failure in European culture in the case of Existential philosophy, or because transcendence defies empirical norms in the case of science. The effect in either case is the denial of the reality of the human person, most explicitly drawn by Wilson when he states that the individual is evanescent, that only genes, in effect, are real. For Wilson, the gene pool is the one surviving constant of evolutionary process which he has absurdly extended from its proper place as an abstraction of evolutionary science to a basis for norms of human behavior. But these norms are not really moral norms, lacking the aspect of moral compulsion that prescriptive moral rules have, which leads to another thing that Wilson shares with the Existentialists, i.e., the reliance on human will to break out of the circularity of the dilemma posed by the denial of purpose and the need for action. With the denial of the reality of the human person comes the somewhat contradictory reliance on pure acts of will, unconnected to any understood essential human purpose.

*Nature*

Wilson has written a book about human nature, which is enough in it-
self to have enraged his left-wing critics because nature implies a set of definite characteristics and limits to the kinds of possible arrangements of human nature and society. However, that nature as Wilson describes it, is mechanical and totally biological; it is human nature with more emphasis on the "nature" than on the "human." Yet even a reductively inclined description of the biological nature of the human race implies that some types of behavior are more beneficial for it than others, leading to some kind of norms. However, the norms can hardly be called moral principles, which raises the question, how close is Wilson to a position resembling natural law philosophy?

The old biology on which the Medieval principle of natural law was based was teleological; that is, its descriptions of natural phenomena took in not only material and efficient causes, but formal and final ones as well, the Aristotelian categories attempting to take in all reality in their purview. But Wilson's biology is relentlessly mechanical, suppressing or neglecting any evidence of non-mechanical reality, even where it is most apparent and even when it leaves his account of human nature more a caricature than a portrait. From this point of attack traditional natural law cannot evolve, the sundering of fact from value accomplished by the construction of a Berlin Wall, as it were, of scientistic prejudice.

There is the other political consequence to the biological view of human nature as well, in the fact that such a view contradicts cultural determinism, culture presumably being a construct as opposed to the given reality which the biology of human nature certainly is. Wilson has tried wherever possible to mitigate the consequences, but it is unconvincing; feminists will not be mollified to learn that biology is even a little bit of destiny. But the human nature that Wilson portrays is morally agnostic, and rules or ideals of public value of any sort will not evolve from it, especially the left-wing ideals which are often not based on observable nature and which must often be imposed on an unwilling populace in spite of the realities of human nature. Thus, Wilson's view of nature is amoral and in essence apolitical, for it allows neither the ideals of the Left nor traditional rules of natural law.

**Mind**

On page 54 of *On Human Nature*, there is a passage in which Wilson is explaining the process of hearing in a human infant. The description uses scientific terminology and is thoroughly mechanistic, the infant being described in a subsequent passage as "this marvelous robot." Wilson traces the sound from the point it begins as waves of compression in the atmosphere to "receptors in the inner ear" to electrical signals
passed to “corresponding masses of nerve cells at successively higher levels of the brain,” to way stations in the hind-brain, to inferior colliculi of the middle brain and medial geniculate bodies of the forebrain, and finally to the auditory cortex, `wherein some manner beyond our present understanding the mind "hears" the sound." (OHN, 54, italics added). It is a revealing passage-an exact scientific description of the process of hearing followed by Wilson's frank admission that he really doesn't know how to explain the last step which is the key to the phenomena, just at that point where the mind finally comprehends it.

In this regard and others, Wilson resembles B. F. Skinner: both utilize humanistic techniques of argument and persuasion to promote a distinctly anti-humanistic point of view; both helped develop a new field of social science which posits an experimental explanation of human behavior; both extend these new discoveries into a virtual philosophy which attempts to categorically reduce every significant aspect of human existence to scientific cause and effect; both, in remarkably similar passages, sixth rail against the ignorance of humanists who will not acknowledge the truth of their reductive explanations of human nature; finally and most importantly, both deny the reality of the human mind, Skinner in order to do away with reports of internal mental states that cannot be verified, Wilson in order to draw a consistently mechanical picture of evolutionary development. The result in both cases is a description of human action and a prescription for social organization that are characteristically incomplete and hollow sounding because they lack any room for human purpose or social ideals. The hubris of the successful scientist claiming that his newly invented paradigm should be extended beyond experimental limits to a philosophy of life has become an all too common feature of the modern intellectual landscape.

In Wilson's case, ignorance of how the mind works is compounded by denial of its actual existence, which forces him to find explanations in place of intentional activity, and which leaves a manifest gap in his account of the origin of human culture. Without mind, he cannot explain by his own admission in OHN, human language, castes or social roles. Nor can he explain the sudden surge of social development in human pre-history, even though the suddenness of the enormous growth spurt of the human brain was well known even to Darwin's contemporary and co-discoverer of evolution, Alfred Russell Wallace and has been copiously documented by fossil evidence since then. Wilson's primary model of human development is that of gene/culture interactionism, but again, it is not an equal partnership. The complaints of Wilson's left-

wing critics after all refer to intentional human activity, that is, the place of mind in the development of human culture, their contention being that mankind somehow makes its own history thereby giving it direct responsibility for the shape of its social arrangements. However, Wilson's view does not combine the view of his left-wing critics on the place of the mind in the development of social culture with the view that biology also plays a role in human affairs. Both the genetic and cultural components as Wilson sees them are part of the evolutionary process, i.e., are selectively determined, for the patterns of culture are themselves established because of their ultimate adaptive effect. Thus, Wilson's strenuous attempts to show the selective advantages of homosexuality, infanticide, religion and war.

Sociobiology's credibility rests on the same "trick" that more conventional evolutionary theory does, the explanation of seemingly purposive organic characteristics that otherwise must seem to be the result of design as being, in reality, the result of a mechanical process. Only the trick is much harder when dealing with cultural and social artifacts, since most of them bear the imprint of the purposes of men and women. To accomplish this trick on the level of social behavior and cultural development, Wilson must find substitutes for the mind as purposive agent. Darwin used "natural selection," but Wilson's choice in OHN is hypertrophy, "the extreme growth of pre-existing structures" from the animal to the human spheres (OHN, 89; but hypertrophy does not appear in SBA, cf. chapter 26) supplemented by the theory of the unconscious. In effect, human beings act the way they do, even at their most enlightened and self-conscious, because they are driven to by the intensification of animal urges which they do not recognize because these urges operate on the unconscious level. Wilson does not explain why these urges, so "enormous in their import and effect, remain unconscious, nor why characteristics pre-existent in animal behavior become more intense among humans, so that, for example, bonding becomes religion and altruism becomes sanctity. At this point, it is fair to say that the suppression of mind as an integral aspect of human life and social evolution results in a gross caricature, for in Wilson's portrayal of human nature, human beings are given no credit for intending their own actions or for having made choices at particular moments in history that have influenced the character of a culture.

What is it about the mind that so puts off Wilson, and not only Wilson but Skinner and most other social scientists including psychologists, anthropologists and sociologists? The answer seems to lie in the nature of scientific inquiry itself, in its methodology and its basic premises. First, the introduction of mind (or "will," "intention," "purpose," etc. -all the words that designate that the human individual acts as an agent on his or
her own), is taken to mean that in the context of social science an inherently unpredictable element has been added, a knot or a surd unresolvable into scientific laws which will invalidate any attempt at scientific generalization about human behavior. (Why should human behavior be any different from any other phenomena? the social scientists ask.) Second, if the mind is a real element in human behavior, it stands as one of those inferred entities, like a gene or an atom, which are beyond the scope of our senses but which still have real existence. Only in the case of mind, unlike genes or atoms, the nature of the inferred reality is not such as science deals with, but is rather "metascientific" in nature. Wilson, Skinner and scientific materialists generally deny as a matter of principle the existence of such natures, but such a principle is at best a working assumption and at worst a philosophic prejudice disguised as real science. Science can only presume or hope that all phenomena can be described by its methodology; it is not necessary that it be so. Further, the existence of mind does not prohibit generalizations about human nature; however, these generalizations will not be statistical in nature, but moral. "Ought" will not always be separated from "is," no matter how disconcerting Wilson, Skinner, et al. find that to be.

Yet acknowledgment of the existence of mind would seem to be all the more necessary for sociobiology in that it is a subfield of empirical science which is, in general, a form of knowledge, which it is the primary function of the mind to acquire. The great significance of sociobiology, according to Wilson, is that it connects social science to biology and for the first time gives a truly empirical ground to social science (Freud and Skinner thought the same thing of their fields, however). Further, Wilson writes of logotaxy, the acquisition of knowledge over time (OHN, 169). Science, it is worth noting, is not among those aspects of human existence such as aggression or sexuality that Wilson tries to explain. Of course, the contrast between the scientist striving disinterestedly after pure knowledge and hummingbirds hammering on bark to dislodge insects for food or even monkeys placing boxes on one another to reach a banana suspended from a ceiling is not likely to enforce the proposition that science is a hypertrophic extension of some form of animal behavior. But then this is true of other types of human activity as well, such as religious worship, which Wilson says is the most intractably human of activities. However, to treat the development of science and the acquisition of knowledge that is one of the chief characteristics of human history as Wilson does all other human activities is to invalidate sociobiology itself along with all other kinds of knowledge. Indeed, Wilson claims that evolution is no more than a myth, albeit the myth most likely to reach whatever truth the human mind is capable of reaching. But then, having reduced knowledge to a biological phenomenon, how can Wilson be said
to know this? His biological materialism undermines the whole explanatory edifice of sociobiology once applied to the human race. The denial of mind therefore frustrates Wilson’s whole enterprise.

Value

The question of values is critical for Wilson as it is for any social scientist, for they must recognize the issues of right and wrong and the sources of our belief in and knowledge of standards for evaluating human behavior. The two essential questions are whether there are universal standards of human behavior, and, if so, what their nature and origin are. Wilson answers that there are universal standards of behavior and that their nature is based on their evolutionary origin. Although systems of human value share universal characteristics, as dealt with by Wilson, they are not normative, but descriptive: the universal human tendency to think that standards of value arise from an “external” or transcendent source is, in effect, the rationalization of a biological urge. He dismisses the possibility of a source of values external to biology, expending considerable intellectual effort providing reductive explanations of the origins and operations of value systems, as is evident in his treatments of altruism, religion, and sexuality.

Before proceeding to discuss these three areas, however, it should be emphasized that Wilson’s evolutionism provides a consistent explanation for the manifest persistence of and belief in a universal system of human values, in contrast to most social scientists who accept and often promote a view of cultural and psychological relativism. The reason for the difference is that Wilson’s evolutionary view of human nature, while materialistic, ascribes definite characteristics to it, seeing human beings as having a vast inheritance from their animal ancestry, exercising their wits and energy in social labor while fulfilling themselves individually, but then, only according to biological lineaments. In Wilson’s view, a woman need not be a mother to fulfill herself biologically, but only because spinsterhood fills a biological need which is of adaptive value to her kin.

The subject of kin and kin relations is at the heart of the sociobiological account of value, as can be seen in Wilson’s treatment of altruism. It is interesting at this point to contrast Wilson’s treatment of altruism in SBA and OHN. In SBA, altruism appears as the answer to a sticky explanatory problem, namely self-endangering behavior to protect others; while in OHN, it is taken for granted as completely successful, and appears as the basis for a theory of ethics. Kin selection, it should be pointed out is only a partial answer to the problem, for humans often endanger themselves on behalf of strangers, i.e., where the degree of re-
relationship (shared genetic component) is so tenuous as to obviate kin selection as an explanation. Hence a further step in altruistic explanation is necessary, namely "reciprocal altruism" or the notion that humans make trade-offs of some lesser degree of self-endangerment because they are selectively advantageous. But reciprocal altruism is less an advancement of altruism as an explanation of certain kinds of animal behavior than an admission of its failure when applied to human behavior.

The problem with altruism as a basis of social ethics is that it involves three levels of scientific explanation that are not ultimately consistent. Altruism starts with the individual organism performing a self-sacrificial act on behalf of its kin, thus substituting group selection for individual selection. It then proceeds to explain this seeming contradiction in terms of genes, reducing the individual to an accidental collection of genes and the social group to an abstract population of genes. The genes are said to have their own "morality" (SBA, Chap. 1). Genes are thus supposed to be the ultimate reductive category for both individuals and groups, but there are two basic problems with this. First, genetic reduction does not by any means completely resolve the conflicts between either group and individual selection, or between genetic and individual processes, for in many cases of actual organic struggle, the tension between alternate "targets" or levels of selection cannot be fully explained or understood. Second, in the writing of Wilson and those of other current evolutionists, the gene appears as the main actor in the struggle for survival (Trivers, Mayr, Gould) and this is apparent as a consequence of the basic development of current modern synthetic evolutionary thought that combines Darwinian evolution with Mendelian genetics. This brings up the more fundamental problem, for genes are not biological actors: they do not mate, fight for food, get eaten by predators, or adjust to or become extinct from climatic change. Only individual organisms or the groups in which they actually live may be said to do this. Thus, not only does the genetic explanation of altruism remain incomplete, but it is difficult to see how genes can be moral actors if they are not biological actors. Morality cannot inhere in a chemical abstraction, no matter how profoundly important it is as the basis for a scientific theory.

Wilson's treatment of religion is perhaps the most unsatisfactory portion of his book. Since he admits that his view of scientific materialism stands or falls on the success of its reductive treatment of religion, Wil-

7. See the essay "Replicators and Vehicles" by R. Dawkins for an attempt to deal with the problem of competing targets of selection by a prominent sociobiologist; in Current Problems in Sociobiology, ed. King's College Sociobiology Group (Cambridge, Eng.: Cambridge University Press, 1982), 45-64.
son's failure here indicates the failure of his entire essay. The chapter on religion lacks coherence, consisting mainly of a succession of topics incompletely explained and not always related to each other. Wilson understands his dilemma well, i.e., that religion is so far removed from the main principles of sociobiological explanation that in order to account for religious belief in an evolutionary manner he must extend his use of "hypertrophy" and the unconscious well beyond any previous limit. The link between religiously inspired behavior and improvement of the gene pool is so tenuous that Wilson must invent whole new categories of selective process to account for it, e.g., "ecclesiastical selection." He cannot provide a consistent explanation of the selective advantage of religion because it reaches extremes of both group and individual selection, producing a conflict that Wilson never overcomes.

At the point of explaining the heroic self-sacrifice that religion often inspires (in the chapter on altruism), Wilson is reduced to the use of terminology with no significant meaning. As an act of self-endangerment becomes less useful to oneself or one's kin, it reaches a progressively higher ethical level. Jesus of Nazareth asked the crowds what credit they thought they could get from their Father in heaven if they only aided their kin; "even the tax collectors do this." (Matthew) It is exactly the higher levels of self-sacrifice which are out of the reach of altruistic explanation, which Wilson effectively acknowledges when he refers to Mother Teresa's self-sacrifice as not even hypertrophy, but "ossification." At this level, word play will not help, as Wilson uses bluster when fact will not aid his argument.

The issue of value also affects Wilson's treatment of sexuality, for describing human nature as biological necessarily involves sexuality, indeed may be said to primarily involve it. Wilson's treatment of sexuality is also bound up with politics, for he is at as much pain to avoid conflicts with feminist ideology as he is to promote a biological view of the nature of man. This is responsible for his denial that the two main purposes for the existence of human sexuality, are reproduction and bonding, which the traditional theology of Judaism and Christianity asserts. Wilson is on the horns of a dilemma here, for the biological view of human nature results in what may be called "descriptive standards"; that is, the biological imperative gives us a destiny which we must face if we are to respond truthfully to the facts of our nature. They are not exactly ethical norms in the sense that they are not externally given as for example the Ten Commandments are, nor do they have a moral obligation attached to them, yet they imply that how our nature is constituted leads us to act in a certain way which we can only contravene, as Wilson points out in the instance of gender roles, at a very high social and individual cost. Thus, we are not yet to the point of a traditional ethics of sexuality based on "natu-
ral law," but we are close enough to it to make Wilson cautious about what he describes as the biological function of sexuality. Therefore, his stringent criticism of traditional Jewish and Christian rules for sexual behavior is Wilson's protesting too much, for he can only evade giving traditional sexual morality credence from his evolutionary point of view by ignoring the two most obvious facts about human sexuality. If sex is not in essence a means of reproduction, it is difficult to say what it is: what else do the complicated organs of sex exist for but the normal result of sexual activity, namely offspring? Why deny in this context what Wilson asserts so vigorously in every other context, that human behavior is determined by the need to transmit genes? As for bonding, Wilson waxes almost lyrical about how the lack of pronounced estrus among human females allows for nearly constant sexual contact and its effect on cementing long-term family bonds among humans. But to state that the biological ends of sexuality are reproduction and bonding is to support the validity of traditional sexual ethics, and for Wilson, this was obviously too close for comfort.

Purpose

Wilson's caution when defining the biological purposes of sex brings out something characteristic about his evolutionary point of view and about biological descriptions of human nature generally, namely that it is much more difficult to maintain the separation between fact and value in biological treatments than in the social sciences. The word "nature" tends to take on a purposive connotation while the expression "law of nature" begins to bear a moral as well as a scientific meaning. Of course, as a committed evolutionist, Wilson would deny that, yet his awareness of the proximity of teleological interpretation is evident, for instance, in his attempt to find a selective advantage in homosexuality. Despite the success of Darwinian evolution in substituting a mechanical for a teleological explanation in biology, the language of "functional biology" persists in using words and concepts which reflect purpose. Anatomy, physiology, and medicine must still be concerned with the function of bones, livers, brains, etc., for physicians must know the functions of the internal organs in order both to understand and repair them. The Darwinian response to the persistence of functional thought in biology is to insist that the terms "function" and "purpose" can always be converted from a teleological to a mechanistic explanation. This argument, which is barely convincing on the organic level, is much less convincing on the social level especially for human society, which accounts for much of the weakness of Wilson's case in OHN.

A striking point about Wilson's biological view of human social evolu-
tion is how easily it can be converted from a mechanistic to a teleological understanding. After all, Wilson admits that the sociobiological explanations in communications and castes that describe animal behavior are grossly inadequate in accounting for human behavior (a point he makes in SBA but not OHN), while in the final chapter of SBA, his refusal to cite the human mind as one of the possible causes of the extreme rate of human cultural development is a striking omission. To some paleobiologists and others, the sudden advent of the human brain and the resultant development of a fully human species, whose distinctive characteristics such as language, symbolic thought, culture, and tool-making are present from its first appearance, requires not merely a scientific but a providential explanation. (Such a development of the human species has no immediate selective advantage.) Further, by Wilson’s own account, it is apparent that the history of life on earth forms a progression until it reaches the origin of the human race. Evolution can be said to have the development of the human species as its purpose; if so, teleology has been restored to biology in an evolutionary context. Wilson nowhere mentions this possibility, but other evolutionists have. Darwin and Stephen Gould attack the notion of evolutionary progress, denying that the word “progress” is proper to describe the increase in complexity over time of life on earth. Teilhard and Julian Huxley have what may be termed a teleological view of evolution, Teilhard from a Christian perspective, Huxley from a humanist one. A progressive and hence purposive view of evolution would be the basis for a value system which would reflect human nature and not be materialistic, and which also would not be a justification of the status quo.

Throughout his entire discussion of human evolution, Wilson has made the case for the development of the human race in such a way as to avoid any suggestion that it was purposive. To do this, however, he has had to deny evidence of intentional activity on the part of human beings either individually or socially, and to evade the consequences of his own description of human biology. This tension between the facts that imply purpose and Wilson’s prior commitment to a mechanical view of human life results in OHN in a style that is often discursive and inexact, occasionally even relying on bluster and emphatic denial. This is not the case in *Sociobiology* and SBA where Wilson is well organized and always exact, and where he almost cheerfully acknowledges the limits of present sociobiological explanation when applied to human beings. But in *Sociobiology* he is addressing his fellow scientists while in OHN he is addressing the general public who apparently should not be made aware of the significant weaknesses in the case for the mechanical view of human evolution. But then, OHN is a work of advocacy, not science.