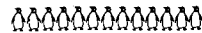


# Sociobiology

New scientific theories, especially when they touch on the mysteries of human behavior, seldom go unchallenged. Such has been the case since Harvard biologist Edward O. Wilson's *Sociobiology: The New Synthesis* was published in late 1975. Wilson sought a biological explanation for animal (and human) social behavior through a fresh application of Darwin's theories of evolution and natural selection. His book was "news" in both specialized journals and major newspapers. This "synthesis" brought heated reactions from other academics—in part, over what some critics perceived as its ethical, racial, and cultural implications. Last November, the American Anthropological Association devoted several sessions at its annual meeting to sociobiology, and the discussion shows no signs of abating. Here, zoologist David P. Barash discusses sociobiology's significance; sociologist Pierre L. van den Berghe explores its ethical aspects; and anthropologist Anthony Leeds offers a sharp but detailed critique of both Wilson and his more extreme detractors.



## THE NEW SYNTHESIS

*by David P. Barash*

More than 100 years after *The Origin of the Species* was first published, students of behavior are finally coming to grips with Darwin's message. It's about time. The behavioral sciences in general—and social science in particular—have long suffered from an inferiority complex relative to the "harder" sciences, notably chemistry and physics. Even a cursory reading of the classic texts in these areas, such as Linus Pauling's *General Chemistry* and Richard Feynman's *Lectures on Physics*, explains why. The physical sciences unfold with an almost irresistible intellectual mo-

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mentum as basic assumptions are checked against the data, hypotheses are generated, and these in turn are checked against more data, thereby generating more hypotheses. The result is a coherent explanation of how the world is put together, one that not only interprets our findings but also provides further insights.

In contrast to the masterful structures of these disciplines, behavioral science is a ramshackle affair indeed, a rickety Tower of Babel with as many viewpoints as there are practitioners and virtually no unifying intellectual underpinnings. But all this is changing with the recognition that biology—and behavior as a branch of biology—possesses an underlying unity. This unifying principle is evolution by natural selection, and it lies at the very core of the synthesis that is sociobiology. In fact, sociobiology is nothing more or less than the application of evolutionary biology to animal social behavior, a notion as old as Darwin but with implications that are only now being explored.

### Experience Versus Evolution

Most scientific revolutions generate controversy and resistance as well as enthusiasm. Until the rise of sociobiology as a discipline, experience was considered to be pre-eminent in influencing behavior. Social scientists in particular have been wedded to the notion that behavior derives from learning and early experience—or from social traditions and cultural norms in the case of human social behavior as studied by anthropologists and sociologists. To some extent, therefore, the suggestion that evolution influences behavior is bound to be controversial. But the issue lies deeper. The infusion of evolutionary concepts into the study of behavior implies that behavior is subject to the same laws as anatomy and physiology. Despite the furor occasioned by evolution in the 19th century, we never fully appreciated Darwin's message. Granting that humans and all other living things share a common ancestry, we were still content to ignore the implications of evolution for behavior. In so doing, we may have gratified our need for being "special," but at the cost of forgoing an objective, critical examination of ourselves and our fellow creatures.

Although Darwin is its intellectual grandfather, sociobiology is very new, the product of a flurry of activity during the past 15 years. And although the controversy surrounding it derives largely from its application to human behavior, sociobiology itself derives almost entirely from studies of nonhuman animals.

In 1962, the Scottish ecologist V. C. Wynne-Edwards shook

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the world of biology with his book *Animal Dispersion in Relation to Social Behaviour*, in which he suggested that virtually all social behavior—including dominance hierarchies, securing of territories, flocking in birds, herding in mammals, even the nocturnal dances of fireflies—is a means of regulating animal numbers and preventing populations from eating themselves into oblivion. It had long been recognized that socially subordinate individuals often fail to breed and that overpopulation is rare in nature. Wynne-Edwards suggested that social congregations serve to inform individuals of the local population density, so that individuals could avoid overpopulation by regulating their own breeding accordingly.

It was an appealing notion, but Wynne-Edwards recognized that it required altruistic reproductive restraint by the participating individuals counter to the expectations of Darwinian theory, which assumes that individuals will always behave so as to maximize their reproduction. He attempted to justify his suggestion by postulating "group selection"—in which individuals might evolve who reduced their personal reproductive success, providing such "altruistic" behavior contributed to the reproductive success of the groups to which they belonged. Biologists were quick to respond, pointing out that in virtually all such cases, selection operating upon individuals within their own groups would over-ride selection acting among groups.

Natural selection is quintessentially selfish. Traits spread in a population when individuals possessing these traits produce more successful offspring than individuals with other traits. If some individuals within a group benefited the group by restricting their breeding, they would be at the mercy of selfish individuals within the same group who reproduced indiscriminately, even if this meant the extinction of the group. Observations of free-living animals strongly support this view. Reproductive restraint has repeatedly been shown to reflect each animal's attempts to maximize its own reproduction, including certain cases where this is accomplished by temporarily failing to breed. The

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current trend among evolutionary biologists is to regard group selection as theoretically feasible, but the requirements for its occurrence are so extreme that it is very improbable. Indeed, it has yet to be demonstrated in nature.

Why is the issue worth mentioning? Because, in responding to the challenge of group selection, biologists have been forced to examine natural selection as it operates upon individuals rather than groups or species. Out of this has come a new appreciation of the power of evolution. A cornerstone of this new thinking was unveiled in 1966 with the publication of George C. Williams' influential book *Adaptation and Natural Selection: A Critique of Some Current Evolutionary Thought*.

### Altruistic Workers

Another cornerstone of modern sociobiology had been in existence since 1964, when W. D. Hamilton's article "The Genetical Evolution of Social Behaviour" appeared. This British geneticist was particularly concerned with explaining a long-standing puzzle in the biology of the social insects—bees, wasps, and ants—but his findings had enormous significance for all social behavior, including our own. Hamilton addressed himself to the perplexing fact that among honeybees, for example, workers are sterile; they labor altruistically for the success of the queen while not breeding themselves. A case of group selection? Perhaps. But Hamilton pointed out that these insects exhibit a peculiar genetic system: Males are "haploid" (they develop from unfertilized eggs and therefore possess only half as many chromosomes as their "diploid" sisters). As a result, a female worker shares three-quarters of her genes with her sisters, whereas she would share only one-half with her offspring if she were to breed. Hence, a female worker does more to foster her own genotype by staying home and caring for sisters than if she were to leave the hive and attempt to rear a family of her own. Altruism? Again, perhaps, but an altruism that is ultimately selfish in that it promotes each individual's genes, albeit at the cost of producing offspring directly.

By focusing on genes, Hamilton emphasized that even parental behavior is only a special case of concern for others in proportion as those others share the parents' genes. Hence the term



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“kin selection.” For most vertebrates, parents share one-half of their genes with each offspring, one-quarter of their genes with nieces and nephews, and one-eighth with cousins. Kin selection provides a coherent theory for the biology of nepotism, since the “closeness” of relatives depends on the proportion of the genes they share. At the same time, kin selection provides a more acceptable explanation of the evolution of altruistic behavior than group selection.

An animal can be said to behave altruistically if its actions increase the reproductive success (fitness) of another, while decreasing the personal fitness of the performer. In the cases presented thus far, altruism was evidenced by reproductive restraint, but in many cases the relevant behavior may be much more subtle, even though it ultimately results in reduced reproduction. Thus, individuals may share food, provision someone else's offspring, and defend others from predators or warn them when predators approach.

Take this example: Prairie dogs give a warning bark when a coyote appears in the prairie-dog town. In doing so, the alarm-giver is altruistic in that his action increases the chances of survival, and hence reproduction, of the prairie dogs warned by the alarm, but his own chances of reproducing successfully are reduced, since his bark draws the predator's attention to himself. However, if a sufficient number of the alarm-caller's relatives are saved as a result, genes for alarm-calling could spread in the population, even though individual alarm-callers are at a personal reproductive disadvantage.

### **Cost-Benefit Analysis**

In discussions of the sociobiology of altruism, no assumptions need be made concerning consciousness or personal motivation. Altruism is defined solely by the consequences of a particular act for fitness, so it is acceptable to speak of altruistic turkeys, honeybees, or even viruses. Kin selection theory states that, in general, the occurrence of altruistic behavior increases with the “closeness” of the beneficiary (the more genes shared by common ancestry, the more likely is altruistic behavior). Similarly, altruism is more likely when the cost to the altruist, measured as a decline in its personal fitness, is low and the recipient's benefit is great. By manipulating these factors, we can derive various predictions for the occurrence of altruism as determined by kin selection.

Findings so far are consistent with this theory. Thus, in the

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only vertebrate species known that practices "simultaneous polyandry" (several males sharing the same female), the males tend to be brothers so that each male, if not a father, is at least an uncle through his "altruistic" tolerance of his sib. In several bird species, young adults often help older pairs provision their offspring; significantly, this altruistic "helping at the nest" is invariably done by close relatives of the pair being aided. Most often, they are offspring from a previous brood. Their altruism promotes their own genotype, since it helps to rear siblings with whom the helpers share genes. Studies of Japanese macaque monkeys reveal that they are likely to share food with others in direct proportion to the closeness of the relationship. The list of such kin-selection cases is long and growing, providing sociobiologists with a valuable "handle" on social interactions between individuals—non-human animals for certain and quite possibly the human species as well.

### Adaptive Social Behavior

A major insight of sociobiology is the recognition that behavior, even complex social behavior, has evolved just as teeth, feathers, and bone have evolved. If so, then social behavior should be adaptive. It should somehow be attuned to particular environments so as to maximize the reproductive success of individuals showing that behavior. By the 1960s, patterns began to emerge from the numerous long-term field studies of animal social behavior. These patterns differed for each animal group studied, but the underlying truth was clear: The complex social systems of free-living animals revealed the unmistakable imprint of natural selection.

An example from my own work on marmots should suffice. Woodchucks are marmots common in the eastern United States, where they occupy low-elevation fields. These animals are solitary and aggressive. The Olympic marmot, by contrast, lives above



## GLOSSARY

**Sociobiology** The systematic study of the biological basis of all social behavior.

**Adaptation** In evolutionary biology, any structure, physiological process, or behavioral pattern that makes an organism more fit to survive and to reproduce in comparison with other members of the same species. Also, the evolutionary process leading to the formation of such a trait.

**Altruism** Self-destructive behavior performed for the benefit of others.

**Chromosome** A complex, often rodlike structure found in the nucleus of a cell, bearing part of the basic genetic units (genes) of the cell.

**Darwinism** The theory of evolution by natural selection, as originally propounded by Charles Darwin. The modern version of this theory still recognizes natural selection as the central process, and for this reason is often called Neo-Darwinism.

**DNA (deoxyribonucleic acid)** The basic hereditary material of all kinds of organisms. In higher organisms, including animals, the great bulk of DNA is located within the chromosomes.

**Ethology** The study of whole patterns of animal behavior in natural environments, stressing the analysis of adaptation and the evolution of the patterns.

**Evolution** Any gradual change. Organic evolution, often referred to as evolution for short, is any genetic change in organisms from generation to generation or, more strictly, a change in gene frequencies within populations from generation to generation.

the timberline in the Olympic Mountains of Washington. In this severe environment, Olympic marmots are socially tolerant, living in large colonies. Members of a third species, the yellow-bellied marmot, inhabit environments of intermediate severity in the Rockies and Sierras, and their social system is appropriately intermediate; they live in colonies, to be sure, but these are loosely organized, and the few interactions between residents tend to be rather aggressive. Furthermore, another high-mountain dweller, the hoary marmot of the northern Rockies and Cascades,

**Genetic fitness** The contribution to the next generation of one genotype in a population relative to the contributions of other genotypes. By definition, this process of natural selection leads to the prevalence of the genotypes with the highest fitness.

**Genotype** The genetic constitution of an individual organism, designated with reference either to a single trait or to a set of traits.

**Kin selection** The selection of genes due to one or more individuals favoring or disfavoring the survival and reproduction of relatives (other than offspring) who possess the same genes by common descent. One of the extreme forms of group selection.

**Natural selection** The differential contribution of offspring to the next generation by individuals of different genetic types but belonging to the same population. This is the basic mechanism proposed by Charles Darwin and is generally regarded today as the main guiding force in evolution.

**Parental investment** Any behavior toward offspring that increases the chances of the offspring's survival at the cost of the parent's ability to invest in other offspring.

**Phenotype** The observable properties of an organism as they have developed under the combined influences of the genetic constitution of the individual and the effects of environmental factors.

**Reproductive success** The number of surviving offspring of an individual.

**Selfishness** In the strict usage of sociobiology, behavior that benefits the individual in terms of genetic fitness at the expense of the genetic fitness of other members of the same species.

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lives in a social system that closely resembles that of its high-elevation cousin, the Olympic marmot.

To complete the correlation between environments and social systems for this group, I found that some yellow-bellied marmots (the intermediate-elevation, intermediately aggressive species) also live in high-elevation situations and display the social system shown by Olympic and hoary marmots. Of course, it is one thing to document a correlation and quite another to determine its cause. In this case, there are other correlations: Animals at



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higher elevations grow more slowly than at low elevations, become sexually mature later, and reproduce less often. It appears that such animals have evolved social systems whose tolerance varies with the necessity for young animals to remain within the colony and thus enhance their own chances of survival and, eventually, reproduction.

With their attention newly focused upon natural selection, behavioral biologists developed a whole new range of theory relating evolution to social behavior. For example, a model was developed showing how female choice is largely responsible for the evolution of mating systems in birds and mammals, the choice in each case attuned to the maximizing of evolutionary fitness. Thus, some red-winged blackbird males typically mate with several females, leaving some males with no females at all. Given that females profit from male assistance in rearing offspring, it seems that females would prefer to mate with a bachelor and thus receive his undivided attention, rather than share their mate with other females. It was shown, however, that females prefer harem membership to cozy monogamy, so long as the harem-master offers enough benefits to compensate for the loss of his undivided attention. This occurs especially when territories offered by males differ in such matters as food supply and protection from predators, which maximize their reproduction and that of their relatives. The niceties of domesticity take second place to the selfish realities of evolution.

### **Reciprocal Altruism**

Males, or any individuals that defend a territory, have also been shown to be sensitive to economic considerations of cost and benefit. Territories are maintained when they are objects of competition and contain resources that can be economically defended. A model has been proposed for the evolution of "reciprocal altruism," a system in which altruistic tendencies can be selected, even in the absence of genetic relatedness. The point here is that the beneficiaries have an opportunity to reciprocate, thereby repaying the original altruist; again, as with all sociobiologic considerations, "payment" is measured ultimately in units of evolutionary fitness.

The evolution of reciprocity is sensitive to the appearance of "cheaters," individuals who receive help from others but refuse to reciprocate when the opportunity arises. Cheating tendencies would spread in such a population, since cheaters would gain fitness at the expense of the altruists. On the other hand, this

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should result in selection on the basis of ability to discriminate cheaters from non-cheaters—especially important for our own species, given our extraordinary concern with character and past behavior.

Sociobiologic theory has also dealt with the ubiquitous phenomenon of male-female differences in behavior, especially reproductive behavior. Among animals, males are nearly always the sexual aggressors, playing relatively fast and loose, whereas females tend to be coy and discriminating. Harvard biologist Robert Trivers (responsible for the concept of reciprocal altruism, discussed above) has made an enormous contribution with his elaboration of the idea of "parental investment," defined as any investment directed toward offspring that enhances their chances of survival and reproduction and is made at the cost of the parent's ability to invest in subsequent offspring and other kin. Females generally invest more than males: Eggs "cost" more than sperm. Furthermore, reproducing females among mammals must undergo pregnancy and lactation. Small wonder males are the aggressive adversaries and females the careful comparison shoppers.

### Game Theory

The implications of parental investment theory go even further. Thus, individuals of the sex investing less—usually the males—can be expected to compete among themselves for access to individuals of the sex investing more. This explains the occurrence of large, brightly colored, aggressive males in most birds and mammals. The exact opposite is found in those rare species in which the males invest more than do females. In such cases, the females are appropriately large, brightly colored, and aggressive. Moreover, male-female differences in parenting behavior are related to differences in confidence of the genetic relatedness to the offspring. Females are always related to the young they produce; males have no such assurance. Significantly, male involvement in care of the young in most animals is greatest when male confidence in paternity is most assured.

Sociobiologists have applied the mathematics of game theory to aggressive encounters between animals, arguing that stable strategies of behavior should evolve when fixed costs and benefits are associated with different behaviors. For example, there is a cost associated with fighting (risk of injury and time expended) but also a possible benefit (access to food, female, nest site, or whatever). When appropriate values are given to these

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considerations, the results help explain why animals often stop short of killing, or even injuring, defeated opponents. Such animals adopt the behavioral strategy that maximizes their evolutionary fitness, consistent with the other findings described above.

With all these exciting theories and supporting data in the air, it remained for Harvard zoologist E. O. Wilson to bring it all together in a masterful, encyclopedic synthesis in 1975.\* Sociobiology existed before Wilson's book, but it has not been the same since. He gave it a name, gathered the materials in one convenient place, and received a great deal of acclaim—and no small amount of criticism and abuse.

### Genetic Influence, Not Determinism

Sociobiologists do not claim that behavior is somehow “controlled” by genes, ignoring the roles of experience and culture. Genes are merely blueprints, patterns for eventual products that may be susceptible to a great deal of modification along the way. Genes influence behavior only to the extent that they code for a range of possible behaviors. In a case like the blink reflex, the range may be narrow and not particularly subject to learning. In other cases, such as the development of personality, the range may be extremely broad. Critics who accuse sociobiology of genetic determinism unfairly oversimplify the issue, since the claim for evolution's relevance to behavior rests on genetic influence, not determinism.

The question of the place of free will in sociobiology is an especially fascinating one. Merely proposing that human behavior is “determined,” or even influenced, by previous experience does not leave us with any more control over our destiny than we had before. I suggest that one is possessed of maximum free will when behaving in accord with one's inclinations; specifying the source of these inclinations does not help to answer the question of free will, although it may help us to understand ourselves. Sociobiology may not explain why we voted for one presidential candidate over another, but it may have a lot to say about why we choose leaders at all. It offers potential insight into the deep structure of human behavior, although this is not to deny the role of experience and culture in producing the final product.

We cannot doubt that the behavior of *Homo sapiens* is the farthest removed from genetic influence of all animals. However,

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\* *Sociobiology: The New Synthesis*. See Background Books, page 143.

this does not mean that we are not susceptible to such influence, and our particular self-interest demands that we use whatever tools we possess to better understand our own nature. Indeed, if biology seems arrogant in claiming insight into human behavior, what of the greater arrogance of a social science that claims no help is needed?

Imagine you have been seriously nearsighted all your life but haven't been aware of it until you are fitted for eyeglasses. Things seen only dimly, if at all, are suddenly clear. Blurry images make sense, and vague relationships have a sharp, new meaning. Sociobiologists have undergone the same kind of an exciting experience in recent years, thanks to the conceptual clarity provided by the application of evolutionary biology to animal social behavior. Since fitness—the key to sociobiology—is so dependent on reproductive success, we might expect reproductive behaviors to be especially sensitive to natural selection, and, indeed, sociobiologic studies of reproductive behavior have been particularly rewarding.

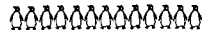
Courtship serves the important function of permitting an individual to assess the characteristics of a prospective mate and to reject those less suitable. Accordingly, predatory birds practice acrobatic, aerial courtships, and most monogamous species insist on prolonged pre-copulatory engagement periods. Among gulls, mated pairs that fail to rear offspring one year are significantly more likely to seek a new mate the following year than are pairs that were reproductively successful. (Isn't this equivalent to divorce?) Male hummingbirds permit females to feed on their territories only when the females permit the males to copulate with them. (Equivalent to prostitution?) A male mountain bluebird who discovers a strange male near his mate will aggressively attack the stranger and will attack his own female as well, provided this occurs at the time copulation normally occurs in nature. (Male response to adultery?)



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Rape is common among many ducks: Unmated males are especially likely to be rapists, and males whose females are being raped often try to intervene; if too late, they often rape the female themselves. Apparently, the males' best (fittest) strategy in such cases is to introduce their sperm as quickly as possible, to compete with the sperm of the rapists. Male lions and langur monkeys who take over a harem of females are apt to kill the infants, thereby eliminating individuals with whom they share no genes and inducing the females to become sexually receptive again, so they can produce their own offspring as quickly as possible—an unpleasant procedure, but, if it results in an increase in gene frequency, animals can be counted on to do it.

A real difficulty in studying human sociobiology is that we are so complex and the ethical restraints on genetic experimentation are so real that it may be virtually impossible to disentangle biological from cultural elements. A productive approach to overcoming this difficulty might be to combine anthropology with evolutionary biology in order to search out the cross-cultural universals in human behavior—the pan-human cake that underlies the diverse cultural icing. With adroit use of the Central Theorem of fitness maximization, it might then be possible to make real and valid predictions in regard to human behavior.



## SOCIOBIOLOGY, DOGMA, AND ETHICS

*by Pierre L. van den Berghe*

Sociobiology applies natural selection theory to behavior. It asserts that the behavior of an animal, like its anatomy, is the product of a process of biological evolution through natural selection. Any behavioral phenotype is the result of the interaction between genotype and environmental conditions (which include other members of the same species and, in the case of man, his material and symbolic culture). For man, culture is indeed a whole new evolutionary ball game; cultural evolution is far more rapid than Darwinian, genetic evolution. However, human culture does not stand apart from biological evolution; it grew out of it and remains inextricably intertwined with it.

One would think that the above statements are by now uncontroversial, at least since the Scopes trial of 1925. Yet, sociobiology has been attacked as a pernicious, racist, reactionary doctrine, much as the proponents of Darwinism at the time of the Scopes trial were accused of being communists, anarchists, and revolutionaries. The New Left of "Science for the People" has joined hands with backwoods fundamentalism in denying the relevance of natural selection for the evolution of human social behavior. No sociobiologist that I know denies the importance of culture in humans—or of "tradition" in many higher vertebrates—but many people, especially social scientists, still deny the relevance of Darwinian evolution to the social behavior of man.

What is at stake is not the uniqueness of man. Every species is unique in some of its aspects, otherwise it would not be a separate species. Nor is it arguable that humans possess a set of capabilities (such as symbolic language, rational choice, conspiratorial behavior, productive and destructive technology, environmental control) that make their evolution, in some important respects, different from that of other species. What sociobiologists refuse to accept is the dogma shared by many

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social scientists that human behavior is infinitely plastic and subject to *no* genetic constraints.

What, if any, are the ethical implications of sociobiology? Certainly, no ethical conclusions logically follow from a sociobiological view of human behavior. Sociobiology is not a moral philosophy. It contains no teleology. It does not assume that evolution—or survival, or reproduction, or anything else—is good, or even that it serves any purpose. Sociobiology and the theory of natural selection that underlies it help to explain why organisms change over time.

### Sociobiology as Ideology

Strictly speaking, natural selection is not a theory but a tautology: reproductive success is merely the definition of adaptation. Thus, natural selection is the simplest and most general description of how living things change, in both their morphology and their behavior. The specific mechanisms through which this happens (sexual selection and reproduction, meiosis, mutation, recombination through chromosomal crossovers) are still only superficially understood. In any case, one is no more justified in ascribing an intrinsic morality, ideology, or teleology to sociobiology than to astronomy or biochemistry.

The critics of sociobiology come principally from self-styled leftist circles who fear that sociobiology will become an ideology of racism and conservatism, as a strain of Social Darwinism did in the late 19th century. Others fear the specter of eugenics and genetic engineering. It is possible, for instance, that significant genetic differences may be found in behavioral traits between human groups and, if found, highly probable that they may serve to justify many human prejudices. The fact that males and females of our species, and of other sexually reproducing species as well, behave differently, in part because of genetic and biochemical differences, has spawned a multitude of ideologies and moralities.

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Sociobiology is hardly to blame. We can just as well expect sociobiology to have a liberating, liberalizing, even revolutionizing influence. By stressing how fundamentally alike humans are beneath their cultural differences, for instance, sociobiology could be a powerful antidote to racism. Or by using our knowledge of the causes of sex differences, we could engineer the reduction of sexual dimorphism in humans and strike a blow for androgyny. The possibilities are endless. Because of our recent experiences with racism and genocide, we are especially sensitive to critics from the left, but in the 19th century religious fundamentalists saw Darwinism as a threateningly radical ideology. Our *use* of knowledge bears only accidental resemblance to the content of scientific theories. Perhaps the safest conclusion is that knowledge is commonly used for self-serving purposes and that, since it is often most effectively used by those in power, it generally serves conservative ends.

It is true that scientists, whether of the left or the right, have ideological biases like the rest of mankind, and these privately held values inevitably intrude on, and bias, scientific inquiry. It is also true that in social science, the borderline between would-be scientific theory and ideology is frequently fuzzy, and therefore the practice of questioning one's motives and values is a sound corrective to the intrusion of values in scientific inquiry.

Sociobiologists cover approximately the same political spectrum as academics in other disciplines, with a center of gravity that is clearly left of center on the American political scene. Some of the people whom critics of sociobiology have sought to identify with sociobiology are entirely outside the current of sociobiological thinking. Arthur Jensen, for instance, makes meaningless statements (e.g., on proportions of IQ variance attributable to heredity rather than the environment) to which few if any sociobiologists or population geneticists, aware of the complexity of the relationship between phenotype and genotype in intelligence, would subscribe.

Could there not be a sociobiological basis to some of our moral and ethical precepts? Some evidence suggests that, within broad limits, moral injunctions are congruent with evolutionary strategies of fitness maximization. Consider the double standard of sexual morality found in a wide variety of cultures. To put it briefly: To the extent that females of practically all sexually reproducing species produce far fewer, bigger, and therefore more valuable, gametes than males, they can be expected to be more selective than males in the choice of mating partners and



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to appreciate quality rather than quantity of offspring. The argument applies even more to mammals, where the number of offspring is limited, where gestation is long, and where lactation further increases maternal, as opposed to paternal, investment in the young. It is not only human females who play coy—and are left holding the babies.

Our own society in the last couple of decades seems to be moving toward a sexual morality that rejects the double standard. My argument is clearly not that we have a gene for the double standard and that our behavior in this respect is so rigidly programmed that our culture cannot modify it. Rather, I suggest that the double standard of sexual morality in humans is a *cultural codification* of differential reproductive strategies of males and females. So far as we know, moral standards are unique to humans, but differential parental investment of males and females in offspring is general to sexually reproducing species, including our own. Our recent technology of contraception, in effect, dissociates sexual and reproductive behavior. The risk of conception, even with an unfit partner, is reduced dramatically for females, and, lo and behold, sexual morality changes.

### Culture and Genes

This example is instructive because it suggests that the linkages between culture and genes are anything but simple or mechanically deterministic. We certainly have the capability to alter drastically the course of our evolution, culturally and even genetically. This is not to say that our behavior ceases completely to be biologically predisposed. It will be interesting to see whether the technology of contraception will have a feedback effect on the physiology of sexual arousal. Assuming that slower female arousal was an adaptive response to greater female cost of reproduction, the new culturally created conditions should over a few generations reduce sexual differences in speed of arousal. Culture not only acts on genes, but genes act on culture. It works both ways.

A second illustration of a possible sociobiological basis for ethics is far broader in scope. It concerns the complex set of social norms that underlies social existence itself and is present in varying degrees in all human societies. At a minimum, moral rules enjoin us to honor our father and mother and cherish our children, but almost invariably morality extends beyond the nuclear family to kin groups (lineages, clans) and to still larger groups ("racial," ethnic, linguistic, religious, national). A few

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ethical systems have encompassed, at least in theory, our entire species: Hinduism, Buddhism, and Jainism go so far as to extend moral precepts to all living things. Generally, however, the more sweeping the scope of moral precepts, the less well they work in practice. When morality is extended beyond the nuclear or extended family, it frequently uses the idiom of kinship: Members of a race or of a religious sect are "brothers" and "sisters" to each other; the emperor is the "father" of his subjects; it is for the "fatherland" or the "mother country" that we allow ourselves to be slaughtered in time of war; and so on.

### Enlightened Self-Interest

Insofar as these moralities are effective in eliciting "altruistic" behavior—beneficial to "alter" at some cost to "ego"—they parallel in their effects what sociobiologists call "kin selection," "inclusive fitness," and, rather misleadingly, "altruism." Altruism is a misnomer because it refers in fact to the ultimate form of genetic selfishness. Kin-selection theory says in effect that our altruism is proportional to the number of genes we share with the beneficiaries of our altruism. By increasing the reproductive fitness of those who share some of our genes, we indirectly, and to the extent that we are related, enhance our own fitness or, more precisely, that of our genes.

There is no need to postulate any genes for altruism. All the theory says is that those genes carried in organisms that contribute to their own fitness *and* to that of related organisms will, by definition, increase their representation in the gene pool of the next generation—as compared to the competing alleles of the same genes in organisms that, say, cannibalize their siblings or favor strangers over their own children. The more distant the relationship—and, hence, the lower the probability of shared genes—the weaker are the fitness benefits of altruism and the less effective its operation. General philanthropy cuts little ice; charity, we all know, begins at home. A man can be expected to help his children, his siblings, his parents, and in a pinch his cousins, uncles, aunts, nephews, and nieces. To a more limited extent, he will extend his altruism to other members of his tribe, "race," or religion, whom he vaguely considers to be distant kin.

The moral precepts of most human societies are, in general, what biological kin selection would lead us to expect. Of course, human altruism cannot be reduced to a blind, unconscious drive for genetic fitness. Man is capable not only of blind, genetic

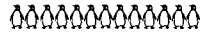
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selfishness but also of enlightened selfishness. We consciously do others good turns on the expectation of being repaid, because we are able to distinguish the cheaters from those who play the game our way. Again, we find that cooperative behavior in man is a complex blend of genetic predispositions and cultural arrangements.

Inevitably, the charge will be made that sociobiology is the same old ethic of enlightened self-interest in a new garb. It will do little good to disclaim any advocacy of selfishness, for many people are simply incapable of dissociating a description of reality from advocacy. The fact remains that the social behavior of an organism is such that consciously, or more often unconsciously, it will act so as to increase its fitness. That is what it has been selected to do. The seeming exceptions to that rule turn out on closer analysis to be easily explainable in terms of inclusive fitness through kin selection or "reciprocal altruism"—for which read "enlightened self-interest over a sequence of interactions."

Sociobiology is not a new ethic, but it can, perhaps, throw some light on the study of ethics. If social scientists want to achieve a well-rounded understanding of human behavior, they will have to abandon the dogma that man is purely a product of his upbringing and his culture. The most lowly organism is the result of both its ontogeny and its phylogeny. This is also true of man. Ethics are, so far as we know, a human monopoly and a cultural development, but they do not exist in a biological vacuum.

We are not disembodied spirits. We are a very special kind of self-conscious animal, but an animal all the same. And we run the risk of making asses of ourselves if we should forget that at some very fundamental level we are mortal conglomerations of billions of cells that evolved as carnal envelopes for the transmission of potentially immortal genes.



## SOCIOBIOLOGY, ANTI-SOCIOBIOLOGY, AND HUMAN NATURE

*by Anthony Leeds*

The acclaim that greeted Edward O. Wilson's *Sociobiology* as a breakthrough in various domains of biological and social sciences has had its match in critical attacks on the author's failure to understand human cultural and social organizations as well as attacks on some basic misconceptions in biology itself. In this essay, I address only the question of "human nature," specifically Wilson's sociocultural misconceptions about human nature, which is also a central, unresolved problem for his critics.

The key issue with which both sides must deal is this: Innumerable human sociocultural universals clearly indicate a biological basis. At the same time *all specifics* of these universals are highly varied in form and content (e.g., all aspects of culture and social organization), exchangeable among distant populations (e.g., the diffusion of Western-style haircuts around the world), and rapidly responsive to changes in situation (e.g., rapid social reorganization after a crisis such as the Irish famine of 1845-48).

That these specifics cannot be genetically determined is clear. All human sociocultural behavior is based upon postulation, on the taking for granted, on assumption, that something exists, is real, or necessary, without proof. *What* is postulated has no genetic foundation whatever. Moreover, a uniquely human reflexivity permits man to observe himself as object—to detach himself from his physical, biological, or cultural self—with profound consequences. A quite different model of the relationship between the *genetic* foundation of the species and its *behavior* is needed for human beings than the models afforded by any other species. The model for humans must deal with

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genetic structures generating broad, formless universals, within which nongenetic generators of behavior define form, content, and meaning.

The biological sciences are far from dealing with such a problem. Despite Wilson's 500 pages of data and argumentation about various animals purporting to show the evolution of characteristics such as altruism and self-interest (based on the conceptual work of Robert Trivers), the behavior of even the most highly organized social animals and insects does not provide a satisfactory model for the behavior of postulating and reflexive humans.

### Wilson's Human Nature and Epistemology

Wilson's book presents a theory of human nature that can be set forth fairly simply despite elements of contradiction within the text and in the author's own post-publication statements.\* In his text, Wilson conceives human nature to be biologically based; Hence the subject matters of the social sciences and humanities—human societies and cultures—constitute essentially biological phenomena. The ultimate reduction of the social sciences and humanities to branches of the biological sciences appears to be the object of Wilson's polemic; his title indicates the road.

Wilson's conception takes many shapes. It includes the postulation of genes for this or that supposed single attribute of human behavior, such as guilt, homosexuality, spite, gullibility, etc. (and postulation it is, since no "homosexual gene" or "gullibility gene" has been identified). Numberless passages indicate that human nature is based in specific genes, produced

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\* "Variation in the rules among human cultures, however slight, might provide clues to underlying genetic differences, particularly when it is correlated with variations in behavioral traits known to be heritable" (*Sociobiology: The New Synthesis*, p. 550). The entire section of which this passage is an example attempts to geneticize human behavior. Yet Wilson, in an interview published Nov. 9, 1975, told the *New York Times*, "I see maybe 10 percent of human behavior as genetic and 90 percent as environmental." The two positions are incompatible.

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through a Darwinian natural and sexual selection. This notion is one for the geneticists and biochemists to argue, but it does seem palpably contrary to what is known of the biochemical make-up and the genes.

A key aspect of Wilson's conception of human nature, which sets the arguments of the entire book, appears on the opening page:

Camus said that the only serious philosophical question is suicide. That is wrong even in the strict sense intended. The biologist, who is concerned with questions of physiology and evolutionary history, realizes that self-knowledge is constrained and shaped by the emotional control centers in the hypothalamus and limbic system of the brain. These centers flood our consciousness with all the emotions—hate, love, guilt, fear, and others—that are consulted by ethical philosophers who wish to intuit the standards of good and evil. What, we are then compelled to ask, made the hypothalamus and limbic system? They evolved by natural selection. That simple biological statement must be pursued to explain ethics and ethical philosophers, if not epistemology\* and epistemologists, at all depths. Self-existence, or the suicide that terminates it, is not the central question of philosophy. The hypothalamic-limbic complex automatically denies such logical reduction by countering it with feelings of guilt and altruism.

Here we have a traditional Western mind/body dualism, sanctified by apparently scientific backing. Wilson's dualism counterposes, on one side, reason, rationality, mind, intellect and, on the other, unreason, irrationality, body, emotions. The emotions are irruptive, violent, bestial: They "constrain our knowledge," "flood our consciousness," and prevent "logical reduction." Emotions located in an archaic system in the evolution of animal species—"the hypothalamic-limbic complex"—destroy the order of the world. Suicide is an irrational, not a moral-philosophical act. Because the limbic system appears relatively early in the evolution of higher animals, Wilson assumes that this "system" is bestial in character, a major *a priori* that provides the structure for his whole argument.

Knowledge and knowing, for Wilson, come not from emotions but from "reason," exemplified entirely by predicative discourse, as in language and mathematics. Wilson either does not

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\* Or theory of the nature of knowledge.

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know or simply avoids mentioning epistemologies that deny this entire mode of thought, such as that of Lancelot Law Whyte, a physicist and biologist (not listed in Wilson's immense bibliography or index), who turns the entire conception upside down. In *The Universe of Experience: A World View Beyond Science and Religion* (Harper, 1974), Whyte sees all primary knowledge as coming from the unconscious and emotional life.

### SSG's Human Nature and Epistemology

Shortly after Wilson's book appeared, an outcry against its conception of human nature arose. The earliest and still one of the main antagonists was the Boston-based Sociobiology Study Group (hereinafter SSG or "antagonists"), which published the first broadside against *Sociobiology* in the *New York Review of Books* on November 13, 1975. I have been a member of the SSG\* since shortly after its inception and was also a signatory to a second article, "Sociobiology—Another Biological Determinism," published in *BioScience* in March 1976. In essence, the SSG asserted that Wilson's whole conception of human nature was limited to our time and place in the universe—ours, as a capitalist, competitive, invidiously alienated people in a United States that is now the central world power. I think this criticism is substantially true, but not basic.

The SSG also asserted that a scientific basis for attributing genetic foundations to human sociocultural characteristics was entirely absent. No specific genes for specific attributes have been isolated (nor could they be, since genes do not work that way). The similarities of human genetic structures are far greater among human populations than the enormous diversity of sociocultural manifestations, which can change drastically at very rapid rates in a given population and be diffused from population to population—or can even be taught to *older* generations.

Some broad relationship between genetically structured species characteristics of *Homo sapiens* and specifiable sociocultural domains cannot be avoided, however. The relationship is clearly *not* Wilson's simple-minded genetic determinism, but it is also not his antagonists' environmentalism. This point is absolutely central to understanding and moving beyond the

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\* Members included microbiologist Jon Beckwith, biologist Richard Lewontin, zoologist Steven Gould, biologist Ruth Hubbard, microbiologist Hiroshi Inouye, all of Harvard; psychologist Steven Chorover of M.I.T.; and psychiatrist Herb Schreier of Massachusetts General Hospital.

controversy involving Wilson, other sociobiologists, and their antagonists.

The SSG's form of argument is called environmentalism. By some it is called (rightly in my view) "extreme environmentalism," because it regards humans as essentially beings of cultural norms and the institutions derived from them. Environmentalism ascribes the characteristics of (human) behavior to environmental conditions and situations; its extreme version denies that any significant human behavior has biological foundations. In SSG's initial attack in the *New York Review of Books*, this statement was included (over my strong objection): "We suspect that human biological universals are to be discovered more in the generalities of eating, excreting, and sleeping than in [highly selected human habits]."\* These functions are shared with, among other animals, the dog, viper, goose, and ass, with which I prefer not to be identified.

The SSG, then, found itself in a very peculiar position. It had, in fact, stated that the only attributes common to humans—regarding which *Homo sapiens* might be said to have a human nature—were essentially identical to those of other animals, the "bestial" ones.

At the same time, these antagonists of Wilson claimed that all those things that make *Homo sapiens* distinctively human—culture, institutions, "rationality" as contained and expressed in science and language—were denied the status of human nature on the grounds of the relativism of sociocultural variability. In so doing, the SSG denied the goals and activities of the social and humanistic sciences searching for universals—particularly anthropology, which looks not only for sociocultural universals but also for their basis in *Homo sapiens*' biological species characteristics. The SSG's gross evasion of specifically human universals (discussed below) and failure to deal with the disciplines that study them strike me as thoroughly anti-intellectual and nihilistic. In effect, the SSG adopted the same basic epistemology as Wilson's—one that separates mind and body and opposes cultural rationalities to "bestialities." It thereby denies a large body of contemporary thought offering alternative epistemologies. In the present controversy between Wilson and one group of his critics (the SSG), the antithesis echoes the thesis.

In what follows, I present several problems that now one, now the other, party to the controversy—and sometimes both, given their philosophical and substantive positions—cannot treat. These problems come in part out of various sorts of inquiry in

\* *New York Review of Books*, Nov. 13, 1975, p. 43.



### AGAINST "SOCIOBIOLOGY"

*Excerpt from a letter to the editors of the New York Review of Books, November 13, 1975, from a group of students and professors in the Boston area, sharply critical of Edward O. Wilson's Sociobiology:*

What Wilson's book illustrates to us is the enormous difficulty in separating out not only the effects of environment (e.g., cultural transmission) but also the personal and social class prejudices of the researcher. Wilson joins the long parade of biological determinists whose work has served to buttress the institutions of their society by exonerating them from responsibility for social problems.

anthropology, although they are not restricted to that discipline, in part out of my own work and experience. Each area is one in which major research should and could be carried out.

The first problem is that of human universals. Historically, the idea of universals was not phrased in terms of a set of elements, but appeared in such concepts as the universality or catholicity of the Church, along with its explanatory theology. A later idea is that of the "psychic unity of mankind," which has permeated anthropology explicitly, and other disciplines implicitly, for at least a century. It asserts that all human populations are characterized by the same attributes and functions of mind. Thus, the basic perceptual and cognitive processes are identical. In effect, we can all understand each other fully; cultural and language differences are only local and secondary. In principle, total translatability within our species is possible, while interspecies translatabilities scarcely exist. Our concepts of most, or all, major human sociocultural processes are built on this idea.

More recent inquiry has been more analytic and less concerned about the species as such than about behavioral domains. Linguists are concerned with "language universals"—structural properties such as negation, predication, and question formation, found in all languages.

Many disciplines are concerned with the universal occurrence of metaphor—visual, aural, and especially, linguistic. In a sense, all language is metaphor, since all words are, at best, arbitrarily encoded allusions to selected attributes only (a strictly human phenomenon involving *postulation*) and *not* to the totalities of

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situations experienced. In a narrower, more usual sense of metaphor, images from varieties of settings and times and in various distortions are juxtaposed in the single expressive form, a possibility uniquely afforded by the abstracted and arbitrarily referential, postulational, extra-somatic human symbol. (Only for humans does the tyger burn bright in the forest of the night.)

Other scholars in various disciplines concern themselves with roles. All humans operate in society only through roles—arbitrary, relativistic, and situational concatenations of non-somatic rights, duties, obligations, and prerogatives, without known parallel among other species. All humans potentially can, and do, change roles by choice, and the same role can be filled by genetically quite different individuals. This includes the 'father' role, universal among humans and including the recognition of paternity, *biological or not*—a normative status unknown to animals. No human kinship role is necessarily a biological one. This fact should present insurmountable difficulties for sociobiologists. Given the sociological characteristics of roles, transfers and exchanges—the foundations of economic and political systems among humans—are entailed *normatively*, not biologically.

### When Postulation Ceases

All human beings exist in a universe whose structures and meanings are "known" to them only through postulation. The capacity or "drive" to postulate may be biologically-genetically based, but *what* is postulated and *what* is known have no known genetic bases at all. When postulation ceases, meaning ceases, too—including Wilson's meaning and that of the SSG's sciences and epistemologies. Finally, postulation is intimately connected with human reflexivity, which is discussed below. The reader will think of many other human universals which cannot be discussed here—music, art, humor, suicide.

This brief review suffices to establish the nature of the problems of universals for the sociobiologists and their antagonists. *Logically*, since many of these universals appear to be strictly human and occur in all human societies, these *species* characteristics must be dealt with by Wilson's antagonists as "human nature." Such universals are no mere arbitrary abstract categories but descriptively established domains of common human experience. The proof of commonality lies in the fact that, *in principle*, anyone can, with time and effort, learn culturally different forms, as any anthropologist, or, say, art historian, knows.

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That is, universal translatability from culture to culture exists *within* domains and, in certain senses, from domain to domain within a culture (as symbols of prestige can be translated into power).

The *fact* of the universality of the various experiential domains requires an explanation of terms of inherent, and ultimately *genetic*, human capacities, as Noam Chomsky has argued in the case of language. That there should be such species characteristics seems to me wholly unobjectionable on genetic grounds. I cannot understand why some of the geneticists of the SSG reject it. The problem is to formulate the *characteristics* of this unique kind of genetic foundation and to specify how it constrains and shapes human behavior, not to reject it out of hand.

### Rule-Breaking and Reflexivity

Wilson's disregard for the fact that human sociocultural features can be created, diffused, lost, or translated into each other is clearly seen in his book's distressing Chapter 27 on human beings.\* The tendency of cultural *expressions* of human universals to vary immensely from population to population, to move around among them, to appear and disappear cannot be coped with at all in terms of Wilson's simplified genetic causality. Clearly what genetic determination there is does not apply to any particular expression but constrains all-possible-expressions. This aspect the sociobiologists—Trivers and Wilson in particular—treat inadequately or not at all. In fact, Wilson beat a drastic retreat in his claims for a sociobiology that would account for human behavior and subsume the social sciences by saying that perhaps only 10 percent of human behavior is genetically determined, as he did to the *New York Times* in the interview noted earlier. (What a sad social science it would be that explained only one-tenth of its material.)

All "normal" humans know that they can break rules. Rule-breaking, an important fact related to the points raised above against Wilson, is one any child can tell you about. Specific rules are widespread, sometimes virtually universal, among cultures

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\* "The transition from purely phenomenological to fundamental theory in sociology must await a full, neuronal explanation of the human brain. Only when the machinery can be torn down on paper at the level of the cell and put together again will the properties of emotion and ethical judgment come clear. Simulations can then be employed to estimate the full range of behavioral responses and the precision of their homeostatic controls. Stress will be evaluated in terms of the neurophysiological perturbations and their relaxation times. Cognition will be translated into circuitry." (*Sociobiology: The New Synthesis*, p. 575.)

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in time and space. But exceptions may also be widespread. If these "rules" have a genetic component, it is the case that recognition of *any* pattern, rule, or norm allows humans, upon reflection, to break or modify them and change behaviors. Reflexivity, recognition, and rule-breaking of this sort are all strikingly human.

Clearly, the relation between "the rules," their genetic foundations, and rule-breaking must be dealt with by both the sociobiologists and their antagonists in a comprehensive theory. Sociobiologists must cope with the fact that "rules" are, for humans, at best, "tendencies" that can be dealt with only statistically and can always be broken. The antagonists must deal with the fact of the statistical tendency toward "rulefulness" as a human-species characteristic. The strongest possible environmental position the anti-sociobiologists can take, I believe, is that departure from the biologically based human "rule" tendencies is a slow process of cultural evolutionary cumulation, itself an uncertain tendency.

Reflexivity, which allows persons to look at their acts, their bodies, or parts thereof, or their psychocultural self-configurations as external objects, is almost certainly a unique human characteristic and conceivably a genetically-based capacity. Together with *postulation*, it permits rule-breaking, including breaking the human rule of postulation itself. It is through reflexivity and the breakdown of postulation that humans arrive at suicide—a uniquely human phenomenon, probably known in all societies but practiced in ways suggesting no significant genetic patterning. Since suicide involves postulation and meaning problems, it remains, despite Wilson, a philosophical, not a biological problem.

### Emotions and Epistemology

Lancelot Whyte, cited above, has argued that fundamental knowledge comes from the inner intuitive world and is merely given justification and communicable order in language. I concur fully and hold that Wilson's epistemology is wholly untenable and very narrowly culture-bound. These contrary positions will not be resolved here, but it is worth sketching the issues.

In any reasonable theory, human or animal emotions are very complex processes, involving sensory inputs, cognitive assessments and evaluations of both. Key, here, is that the emotions are always *directed* at, and are about, *externalities*—including, as Edmund Jacobson points out in *Biology and Emo-*

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tions (Thomas, 1967), reactions about other parts of the body from some other sensory locus in the body. In short, the emotions are object-oriented, assessing objects and their states of being, contexts, and dispositions: The emotions are the sources of basic knowledge. Language and all logical forms derived from it merely translate this knowledge into our major form of communication by abstracting and decontextualizing (with much loss of *objective* information). One consequence of this view is that most of the central core of the "subjective"/"objective" distinction falls to pieces. "Rationality" and "irrationality" display themselves equally in the worlds of scientists' postulations ("the ether," "phlogiston," "ant slavery") and in all human beings' object-oriented, emotional sorting out of meanings through sensory scanning of the external world.

Among human beings, however, the emotions take on a special character, which Wilson, from the perspective of nonhuman animals, seems thoroughly unaware of and, given his paradigm, cannot deal with. All known humans, at least for the last 40,000 years or more, have lived in cultural environments. I mean this in two fundamental senses.

First, all human beings shape their environments (as do innumerable animals and even many plants). But human beings use cultural means, especially technology, in terms of cultural, normative conceptions, formulated as goals and ends. The degree of shaping varies, of course, with the effectiveness of the technology and probably with the scope of the conceptions. But shaping, in some degree or other, takes place in some culturally, that is, *not* biologically, determined way.

Second, all humans define their environment conceptually (postulation, again). All human action is directed *only* at objects so defined and given value. In effect, whatever is undefined conceptually does not exist, although, as external analysts, we may say that these cultural nonexistents in fact affect the culture-carriers. All culture-carriers live exclusively in culturally conceptualized environments—including that very Nature that the Enlightenment and the French sage Claude Lévi-Strauss set against Culture. For example, the concept that there is a "struggle" between "Man" and "Nature" is a relatively recent Western *cultural* artifact, implying an ontology and epistemology of the sort Wilson accepts as "natural": "rational" Man vs. "bestial" Nature. By his very acceptance of it as "natural," it becomes ideology, as well as being philosophically naive.

Thus, from an individual developmental point of view, human beings' chief mode of knowing—the emotions—are *neces-*

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sarily shaped from birth by externalities which, in a double sense, are cultural or culturized and also encoded in language, itself a cultural form and the basic respiratory of "reason." The very form and content of human emotions are therefore necessarily *cultural*, not *bestial*, and *encompass all the logics, rationales, and rationalities* that Wilson denies them, including even "reason" itself. The human beast, Wilson included, lives in an almost (but not quite) tautological world: the means of knowing are shaped by what the means of knowing permit us to create, in an *almost* closed circle. This view of the nature of human knowing is at sharpest variance both with Wilson's conceptions of human nature and with his epistemology. Since the book is built on these two conceptions, much of the logical structure and interpretation would collapse if they were untenable. Particularly, his views on the genetic basis of human behavior become still more ambiguous or entirely untenable.

### Human Sexual Dimorphism

Wilson's antagonists have accused him of "sexism" in his sociobiology: the pervasive reading into animal and human life of the *particular cultural* norms of relations between the sexes in American life. Although I think the assertion true, the SSG itself fails to deal with systematic cross-societal expressions of sexual differences discussed here as sexual dimorphism. However, the "rules" of sexual dimorphism can be and are broken, a fact the sociobiologists must cope with.

The general proposition is as follows. Under primitive techno-social conditions, there is a sharply marked tendency for statistically relatively standard cross-societal *forms* of the division of labor to occur, though ecological bases vary the *content*. This patterning of the division of labor is based, hypothetically, on systemic aspects of the sexual differences between male and female humans: If, *a priori*, one denies that such differences have significant effect, one tends not to look for their existence. But if one asks if it is possible that they have significant sociological consequences, two interesting observations begin to emerge from a systematic pursuit of the question.

One is that the characteristics involved are consistently patterned: Distribution differences by sex are demonstrable and the *directions* of differences tend to fit each other—pattern for males, pattern for females. The other is that, with one exception, they never require sexual exclusivity, although the distribution is heavily lopsided. The implication of the second point is

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that the effects of these dimorphisms *sociologically* appear as tendencies, not as absolutes: Though men and women can both do the same work and sometimes do, the division of labor is significantly differentiated by sex. The absence of exclusivity is demonstrably related to choice, i.e., to reflexivity and "rule"-breaking.

The exception, of course, is the pregnancy-childbirth-lactation sequence. This exclusively female set of attributes is accompanied by *statistically* significant dimorphisms of body build, especially the pelvic area and leg articulations, gait, and possibly other motor behaviors, such as squatting. Not clearly related to reproduction are other accompanying statistically significant dimorphisms in leg-bone proportions, foot structure, etc. All these clearly suggest differential male/female behavior, in part linked to reproductive functions selected for in the primate evolutionary process leading to *Homo sapiens*. "Man the Hunter" and "Woman the Gatherer" (and Baby-Producer) have a major genetical-biological basis, which it is, in my view, folly to deny as long as one recognizes that the behavior observed is a variable statistical distribution, not a biologically absolute requirement (as is the queen bee's performance, for example). Women *can* hunt and men *can* gather; both do. But in the divisions of labor observed, they tend statistically not to. In my language, the rule, though it can be broken, tends to be observed. The cross-societal data leave no doubt about this. This argument can be extended by considering endless arrays of distributions.

### Sexual Divisions of Labor

The important thing to note is that, though aspects of dimorphism are found for other animals, especially the higher primates, their human occurrence must be dealt with as part of human nature and their implications even for contemporary human life assessed. Clearly, the evolution of extra-somatic technology loosens the biological hold. Clearly, the "principle" of rule-breaking means that any of these tendencies can be disregarded—and increasingly tend to be. Yet all societies display sexual divisions of labor. On the whole, this pattern is still evident in our society.

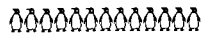
The problem of human sexual dimorphism requires major research. It means that the sociobiologists must review their entire approach to the relations between the sexes, especially where humans are concerned, and particularly their highly individualistic conception of genetic competition be-

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tween the sexes. The anti-sociobiologists must deal with the possibility of systemic, rule-breaking distributions of male and female characteristics seen in relation to sociocultural evolution. The characteristics discussed occur in all human populations and may be seen as species characteristics (some overlapping with other animals) hence, as aspects of human nature, rooted in biology.

The polar positions of the sociobiologists and the anti-sociobiologists lead to stalemate. In basic ways, both sides are locked into the same rules of the game. The result is that crucial questions are not posed because crucial aspects of human beings are not examined, namely: the virtually universal appearance of specific attributes, most of them uniquely human, in all kinds of domains; the great variability of form and content in which these universals appear; the detachability, diffusability, learnability, and loseability of these forms and content; and mankind's peculiar capacity to break practically any "rule," including, perhaps, even those epistemological rules rooted in the biology of his sensory equipment. In a generic sense, the variability within the species' universals, the spatial and temporal unfixeness of the universals, and the rule-breaking are core aspects of human nature.

Both camps avoid consideration of those central capacities of human beings—postulation and reflexivity. Their statements indicate their scientific and philosophical inability to treat the nonbiological, purely human dilemma. Those who have agonized at the sheer edge of convention, where ambiguous culture and its postulational underpinnings erode and reflexive, rational, emotional assessment of self in a universe empty of intrinsic meaning follows, will find that Wilson's *Sociobiology*, for all its monumental amassing of data, has little to say. They will find truth, if little comfort, in Camus' view that the only serious philosophical problem is suicide.





## BACKGROUND BOOKS

### SOCIOBIOLOGY

It all began with Charles R. Darwin in the year 1859.

Whether "sociobiology" is seen as science or pseudoscience, "a new synthesis" or a false step in the study of man's social behavior, the basic book is, of course, the great British naturalist's **ON THE ORIGIN OF SPECIES BY MEANS OF NATURAL SELECTION: or, The Preservation of Favoured Races in the Struggle for Life** (Harvard, 1975, 1st ed. reprint, paper).

In it, Darwin pays particular attention to the social insects (ants, bees, etc.), which had evolved complex systems of caste specialization; even sterile members performed specialized tasks. How could animals that failed to reproduce be part of the evolutionary process? Confronted by this question, Darwin, like many of his scientific descendants, seizes upon the only course open to him. His answer: Such neuters exist because they confer an advantage, not on individuals, but on the societies in which they live.

In a later (1872) study, **THE EXPRESSION OF THE EMOTIONS IN MAN AND ANIMALS** (Univ. of Chicago, 1965, cloth & paper), Darwin attempts to show how the facial expressions and "body language" observed in human beings have evolved from more rudimentary forms of expression in man's primate ancestors. From this early effort to treat behavior as a biological feature akin to muscles and feathers, much analysis was to flow. That man's behavior as well as his body is influenced by natural selection was a revolutionary notion in biology and anthropology. In many ways, it still is.

Post-Darwin intellectual developments

and counterdevelopments produced many important 19th-century books. Of these, the works of Herbert Spencer, another precursor of sociobiology, must be mentioned. Both **SOCIAL STATICS: or, The Conditions Essential to Human Happiness Specified, and the First of Them Developed** (Appleton, 1866; Kelley, 1969) and the three-volume **PRINCIPLES OF SOCIOLOGY** (Appleton, 1880-96; Greenwood, 1975) raise the question whether it is meaningful to ask of Spencer (as it is of Marx) whether he was, as often suggested, a "Social Darwinist."

If Social Darwinism is understood as providing theoretical support for the full-blown competition of man against man, group against group in a bloody war for survival, then the term does not correctly describe Spencer's beliefs. To him, the optimal social organization exists only when the requirements of man's biological nature and those of society are brought into harmony; immorality and evil arise from the discrepancies that exist between biological propensities and social arrangements.

Although Spencer left a legacy to philosophers and social scientists alike, he is today largely unread. Closer to his own time, academic arguments raged round his theories as they do now over sociobiology. Richard Hofstadter in his **SOCIAL DARWINISM AND AMERICAN THOUGHT** (Univ. of Pa., 1944, cloth; Braziller, 1959, rev., cloth & paper) recounts the excesses to which a firm belief in scientific ethics led some Americans. Racism, sexism, imperialism, and xenophobia were allowed to infuse politics in the name of Darwinistic or

Social Darwinistic ideas about nature and behavior. Opposition (as cited in *Popular Science*, April 1894) was known as "Spencer-smashing."

Historian Gertrude Himmelfarb in **DARWIN AND THE DARWINIAN REVOLUTION** (Doubleday, 1959, cloth; Peter Smith, 1967, cloth; Norton, 1968, paper) gives a comprehensive survey of the effects of speculation about man, human evolution, and human behavior on the intellectual world of the late 19th century. Philosopher Maurice Mandelbaum in **HISTORY, MAN, AND REASON: A Study in Nineteenth Century Thought** (Johns Hopkins, 1971, cloth; 1974, paper) demonstrates how fears of the inexorability of social evolutionism and the biological limitations contained in hereditarianism were ameliorated by a belief in the inevitable progressiveness of biological, social, and intellectual evolution. Self-betterment and self-improvement loomed as the saving graces of ethical and political systems built on the scientific understanding of human nature and behavior.

One interesting reaction that came hard on the heels of Darwin's and Spencer's attempts to provide evolutionary explanations for social behavior in animals and man was that of Russian geographer and social theorist Peter Kropotkin. In his recently reprinted 1902 classic, **MUTUAL AID: A Factor of Evolution** (New York Univ., 1972), Kropotkin goes to great lengths to show that as many species of animals and races of man have found cooperation a suitable strategy for survival as competition. *Contra* Darwin, he concludes, Nature's imperative is "Don't compete—competition is always injurious to the species."

Perhaps the first truly "sociobiological" approach to understanding animal behavior appears in American ecologist Warder C. Allee's **ANIMAL AGGREGA-**

**TIONS: A Study in General Sociology** (Univ. of Chicago, 1931) and his later work, **THE SOCIAL LIFE OF ANIMALS** (Norton, 1938). Both books are out of print. Allee's lack of access to mathematical models, genetic findings, or detailed field studies meant that his pioneering attempts to analyze the precipitating conditions for the appearance of certain social behaviors were never fully realized, hence have gone unappreciated.

Allee in the United States tried to direct attention to social behavior viewed from an ecological and demographic perspective. Meanwhile, Konrad Lorenz and Nikolaas (Niko) Tinbergen in Europe were trying to redirect biologists to Darwin's original insight that behavior could be treated like any other organic property and studied by means of comparative genealogies and evolutionary analyses. Lorenz's work on birds had convinced him that much observed behavior in animals had its locus or cause in genetic sources. In his popular book, **ON AGGRESSION** (Harcourt, 1966, cloth; 1974, paper), he summarizes a lifetime in behavioral biology and extends his findings to human beings.

Lorenz emphasizes the importance of genetic factors in triggering such complex behaviors as aggression, sex, dominance, territoriality, love, friendship, and warfare. Not only can much human behavior be understood as outgrowths of our genetic programming but, in his view, our culture and society are at the mercy of our innate (and unpleasant) biological natures. Unlike Spencer, Lorenz sees a world in which killings, violence, selfishness, and competition are unavoidable since no amount of political engineering or socialization can modify our natures.

Tinbergen, in his scholarly **THE STUDY OF INSTINCT** (Folcroft, 1951,

cloth; Oxford, 1969, cloth & paper) and later, popular book, **CURIOUS NATURALISTS** (Basic Books, 1958, cloth; Natural History Library, 1968, paper), also urges the re-acceptance by biologists and social scientists of behavior as a legitimate object of evolutionary inquiry. He decries the tendency among psychologists and ethologists to confine the study of animal and even human behavior to the laboratory and the artificial experiment ("I believe strongly in the importance of natural or unplanned experiments"). Tinbergen's concern with field observations had a marked effect on the development of sociobiological thinking about the evolution and function of social behavior in animals.

Other books published in the 1960s helped to lay the groundwork for today's sociobiology. In **ANIMAL DISPERSION IN RELATION TO SOCIAL BEHAVIOUR** (Hafner, 1962), Vero C. Wynne-Edwards follows the tradition of Allee and theorizes that animals evolve social behavior and organization as an adaptive group response to the threat of overpopulation and the overexploitation of resources. George C. Williams in his lucidly written **ADAPTATION AND NATURAL SELECTION: A Critique of Some Current Evolutionary Thought** (Princeton, 1966, cloth & paper) shows how social behavior can be seen as primarily advantageous, not to a species or group, but to individual genetic perpetuation. Unlike some of his peers, however, Williams stresses that, to prove adaptation, one "must demonstrate a functional design" and "concentrate first on the individual and seek an understanding of the adaptive aspects of its behavior."

Cyril D. Darlington in **GENETICS AND MAN** (Macmillan, 1964, cloth; Schocken, 1969, paper) argues that human behavior not only is subject to the influences of genetics and the en-

vironment but is merely the sum of these interactions. Belief in free will, in human responsibility for action, in choice, and in rationality—all are totally mistaken. "Our instincts may revolt at this conclusion," he writes, "but that is no evidence of its falsehood."

**SOCIAL LIFE OF EARLY MAN**, edited by Sherwood Larned Washburn (Aldine, 1961), and **PRIMATE BEHAVIOR: Field Studies of Monkeys and Apes**, edited by Irven DeVore (Holt, 1965), are two influential collections of papers from this period.

More spectacular books about human and animal behavior came from a group of writers that includes Ashley Montagu, Desmond Morris, Robert Ardrey, Robin Fox, and Lionel Tiger. Many scholars were shocked by the popularization of ethology in books by science writers. But other practicing scientists hopped on the best-seller bandwagon.

Fox and Tiger, collaborators on **THE IMPERIAL ANIMAL** (Holt, 1971, cloth; Dell, 1972, paper), hold that most of our fights, politics, family arrangements, attitudes toward women and children, and assignment of roles in society are merely external reflections of our "biogram," or natural genetic programming.

Tiger's own book, **MEN IN GROUPS** (Random, 1969, cloth; 1970, paper), was much criticized by feminists; the author protested that it was intended to be the opposite of sexist. Surprisingly, a new book by Robert Ardrey, **THE HUNTING HYPOTHESIS: A Personal Conclusion Concerning the Evolutionary Nature of Man** (Atheneum, 1976) seems to have escaped such attacks, despite a bitingly funny chapter entitled "The Sexual Adventure" ("the evolving human female . . . dreamed it up," the author claims). Ardrey's several earlier books, all with long, Darwin-style subtitles (as above), include **THE TERRITORIAL IMPERATIVE** (Atheneum,

1966, cloth; Dell, 1971, paper).

With the appearance of E. O. Wilson's massive **SOCIOBIOLOGY: The New Synthesis** (Harvard, 1975), social behavior gained renewed prominence as a challenge to those evolutionary conceptions which rooted change in the advantages conferred by certain types of behavior on individual organisms. (see pages 114-15.)

Wilson's clarion call for the scientizing of human behavior is echoed by others, among them Pierre van den Berghe (see page 122) in his **MAN AND SOCIETY: A Biosocial View** (Elsevier, 1975, cloth & paper). Richard Dawkins, in his readable **THE SELFISH GENE** (Oxford, 1976), argues that the sort of explanations represented by the work of sociobiologists necessarily revolutionizes the view we have of our own behavior and of ourselves in the world. Dawkins, who acknowledges his debt to Tinbergen, sees human beings as "survival machines—robot vehicles blindly programmed to preserve the selfish molecules known as genes." The contributors to **BIOLOGY AND POLITICS: Recent Explorations** (Humanities, 1976, paper only), edited by Albert Somit, generally agree that political theory and practical politics can only truly be understood in light of the findings of sociobiology and evolutionary biology.

There are many dissenters. In a collection of papers presented at a Smithsonian conference in 1969, published as **MAN AND BEAST: Comparative Social Behavior**, edited by J. F. Eisenberg and

Wilton S. Dillon (Smithsonian Institution Press, 1971), philosopher Susanne K. Langer objects to overemphasis on animal behavior in analyzing human actions and customs. "Facts, opinions, and conceptions of causal relationship (often imaginary) have become the basis of human life," she states.

Social scientist Marshall Sahlins in **THE USE AND ABUSE OF BIOLOGY: An Anthropological Critique of Sociobiology** (Univ. of Mich., 1976, cloth & paper) vigorously enters the lists against the sociobiologists. In his view, far less of human social behavior is determined by biology and genes than the sociobiologists would like us to believe. Sahlins also asks whether Wilson and his supporters may not be repeating historical errors and allowing political and other biases to color the kinds of things sought and found to be "scientifically" true about human nature and behavior.

Another scholar and writer on primate behavior, anthropologist Vernon Reynolds, in **THE BIOLOGY OF HUMAN ACTION** (Freeman, 1976, cloth & paper) writes in mind-stretching detail about emotions and "man's inner dimension." He rejects the idea of biological *predispositions* as unprovable and comes down instead on the side of biological *limitations*. We act on perceptions, culturally organized. For these perceptions (as well as the limits on them) to be better understood, he believes, the academic world needs to see a rapprochement between the biological and social sciences, not a synthesis.

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EDITOR'S NOTE: *Arthur Caplan, who teaches medical ethics at Columbia University's College of Physicians and Surgeons and is at present a postdoctoral Fellow at the Institute of Society, Ethics, and the Life Sciences, Hastings Center, Hastings-on-Hudson, N.Y., suggested many of the books discussed above and commented on some. Two Wilson Center Fellows, John Purcell and Joaquín Romero-Maura, both social scientists who have read widely in biology and ethology, offered other selections and observations.*