

## SOCIOBIOLOGY AND ORIGINAL SIN

by Patricia A. Williams

*Abstract.* This paper argues that the creation narrative of the Fall in Genesis 2:4b–3:24 is not history and does not contain a doctrine of original sin. The doctrine of original sin as a theory of human nature needs a new foundation. The contemporary science of sociobiology has a theory of human nature that is remarkably similar to major versions of the Christian doctrines of original sin. To incorporate sociobiology's theory of human nature into Christianity is to lay the foundation for a new, ecumenical understanding of original sin.

*Keywords:* altruism; Christianity; evolution; human nature; original sin; sociobiology.

---

Sociobiology offers a scientific assessment of human nature that is similar in many ways to that posited by the doctrines of original sin in Christian theology. My argument for this thesis has four parts. First, original sin in Christian theology is two different and separable concepts, one of a historical Fall and one about human nature. Second, modern science falsifies the historicity of the first concept, that of the Fall of Eve and Adam. Third, sociobiology conceptualizes human nature as conflicted, cooperative, and free. Finally, sociobiology's construal of human nature both supports and undermines concepts of human nature in the main theologies of original sin. In doing so, it lays the foundation for a new, ecumenical understanding of original sin.

This discussion differs considerably from previous discussions in *Zygon*. With the exception of an essay by Philip Hefner (1993a), none of the essays in *Zygon* has directly addressed the doctrines of original sin. Hefner's paper argues that human feelings of guilt leading to the doctrines of original sin arise from the dissonance between genes and culture. Although I do not deny that this is an important insight, I focus on the dissonance

Patricia A. Williams is a philosopher. Her address is P. O. Box 69, Coveseville, VA 22931.

[*Zygon*, vol. 35, no. 4 (December 2000).]

© 2000 by the Joint Publication Board of *Zygon*. ISSN 0591-2385

people experience because of their genetic makeup itself and rarely look at culture. When I do glance in that direction, I view culture as normally an extension of genetic predisposition, a view similar to Hefner's. Nonetheless, I also consider culture to be a vehicle capable of countervailing genetic predispositions. The other articles in *Zygon* that touch upon original sin (see especially G. Williams 1988; 1994; Ruse 1988; 1994; Oates 1988; Bradie 1994) focus mostly on morality. The subject of the present essay is broader, touching on human nature itself, of which morality is but one aspect. (Those who are skeptical of the claims of scientific status made for sociobiology's view of human nature might consult Degler 1991 for a historical and critical perspective.)

#### ORIGINAL SIN AS FALL AND AS HUMAN NATURE

It is possible to divide the doctrines of original sin into two different and separable parts. The first part concerns the first sin of the first human beings, Eve and Adam. This first sin is generally recognized as one of disobedience to a known command of God. It is believed to have occurred in a garden called Eden, which was the residence of the first human pair. The story is narrated in Genesis 2:4b–3:24. In this essay, this sin, this deed, this act of disobedience, is not called *original sin* but *the Fall*. I will try to show that it is unlikely to have occurred. The term *original sin* I will reserve for the doctrines of fallen human nature posited by Christian theology.

The second part, then, consists of doctrines about fallen human nature. Fallen human nature, human nature as we now have it, is usually considered the consequence of Eve and Adam's deed.

Among Protestants, Catholics, the Orthodox, and Pelagians (those who subscribe to a Catholic heresy emphasizing free will), there is considerable disagreement about the nature of human nature, a disagreement I hope to resolve. Because of this disagreement, I refer to the doctrines (plural, not singular) of original sin. Despite their differences, the doctrines of original sin have several things in common. They are doctrines of human nature, the nature of all human beings, ancestral, current, and future, except Eve and Adam prior to the Fall (and, in Catholic theology, Mary the mother of Jesus). Three of the four doctrines claim that death and disease are the result of the Fall (Pelagianism is the exception). All of them claim that human conflict is a consequence—that, once in harmony, human beings are now in disharmony with God, with other human beings, and internally within themselves. Although they differ radically on the subject, all of the doctrines hold that human freedom was affected by the Fall, that human beings were more inclined to sin after the Fall than they were before. And all hold that original sin—human nature—is inherited somehow (they differ on how). The whole might be summed up by saying that fallen human beings, beset with original sin, are not naturally inclined to

love God, neighbor, and self—the summary of the law both of the Hebrew Scriptures from a Christian perspective (Matthew 22:37–39) and of the Christian New Testament Epistles (Romans 13:8–10).

#### MODERN SCIENCE AND THE FALL

Until the nineteenth century, most people in Christendom read the Genesis narrative as history. Contemporary species were each created by God. Living organisms were very similar to those at the time of creation. The creation was recent; using biblical material, Bishop James Ussher (1581–1656) dated the creation to 4004 B.C.E. As early as the eighteenth century, geological and biological studies began to change that view. Moreover, internal evidence uncovered by biblical criticism began to undermine belief in the Mosaic authorship of the Pentateuch and the literal truth of the Bible. For example, biblical exegetes recognized that there are two creation narratives in Genesis (1:1–2:4a and 2:4b–3:24) that contradict each other on a number of points and hence cannot both be true histories.

With the publication of Charles Darwin's *On the Origin of Species* in 1859, many of the conundrums in geology and biology were resolved, and considerable light was thrown on the origins of living organisms, the distribution of organisms over the Earth, and relationships among species and among larger groups of organisms. In brief, species had not been separately created; rather, they had evolved from one another over a long, long period of time.

Current cosmological evidence places the age of the universe at some 12 billion years and the age of the Earth at about 4.6 billion. Geology has shown that the continents move around. Paleontology offers clear evidence that plants and animals have changed over time and that most organisms that existed as recently as 65 million years ago, when the dinosaurs went extinct, were very different from those of today. Modern human beings appeared approximately 125,000 years ago. Agriculture is about 10,000 years old. The ancestors of human beings are the social primates. Among the social primates, the chimpanzees are humanity's nearest living relatives, whereas the common ancestors of humankind and the chimpanzees are extinct.

During the past four decades, scientists have studied the other living primates intensively. Many studies are well known, even popular (Ghiglieri 1988; de Waal 1989; Goodall 1990; Diamond 1992). Primates are social animals, as are many other mammals such as hyenas, foxes, and whales. Primates have elaborate social structures that differ from species to species, yet all primates share some social behaviors. Not only do they mate and raise dependent offspring, they form kinship groups, practice mutual grooming, and have varying degrees of dominance and territoriality. Among chimpanzees, food sharing and practices resembling human warfare occur.

Sometimes chimpanzees appear to mourn for their dead relatives (Goodall 1990, 197–205). Conflicts occur among groups and between individuals within groups. Primates make peace (de Waal 1989). Individual primates seem to have to adjust internally to changing circumstances in a way that suggests that they experience internal conflict and sometimes reason about how to handle it (de Waal 1989, Goodall 1990).

Humanity's ancestors must have been similar. They were mortal, social, lived in kinship groups, experienced discord among individuals and groups, knew inner tensions, and were able to resolve conflicts sufficiently well to continue their social lives. There is no suggestion here that human beings ever experienced a state of harmony such as that envisioned in Eden before the Fall. On the other hand, neither did they ever experience the state, posited by Thomas Hobbes (1588–1679), in which there was no social life but a war “of every man against every man” ([1651] 1988, 64). The human species evolved from animals with well-coordinated social skills, with many of the social conflicts and resolutions that are a part of mammalian and primate social life. Social behavior evolved early in human ancestors and lies deep. More recent human ancestors evolved improved intelligence and long-term memory, both of which affect the quality of human social life.

It would seem, then, that the human condition, the state human beings find themselves in today, does not need to be explained in terms of an original harmony from which human beings fell. The Fall is an unnecessary hypothesis. The way human beings are is the result of their evolutionary history. Use of Occam's razor suggests that the creation narratives in Genesis should not be read as history and that explanations of human origins should be left to science.

The Roman Catholic Church has an interesting statement on this issue in its new catechism. It agrees that the Genesis account uses language figuratively but then asserts that “The account . . . affirms a primeval event, a deed . . . committed by our first parents” (*Catechism* 1994, 98, no. 390).<sup>1</sup>

For two reasons, I do not think that this position is sustainable rationally in the light of well-established biology. First, assuming for a moment that there were “first parents,” and that they engaged in a primeval event, some deed or other, the results of the deed would not be inherited. In biological terms, an action or a deed, if habitual, is an acquired characteristic, and biologists have known since Weismann's work from 1885 on (Mayr 1982, 699–701) that acquired characteristics are not inherited. So, although such a deed might explain the sorry state of the primeval pair, the pair's progeny would not be affected by it.

Second, for theoretical reasons it is highly unlikely (although not impossible) that there was one primeval pair, despite recent discussion to the contrary (Cann 1987; Gibbons 1991). Evolution does not happen to individuals but to populations over time. It is thought that the most common

way for new species to evolve is by the geographical isolation of a small portion of a population from a larger population. Because the small group is isolated, it does not interbreed with members of the larger population. Because it is small, its gene pool is not typical of that of the large population for simple statistical reasons. If some of its members survive, a genetic revolution may occur and a new species may evolve. This evolution, however, takes time—10,000 years is the standard estimate of least time. So, even if one pair got isolated and managed to survive, and its offspring did not suffer the lethal effects of inbreeding, the primeval pair would not be *Homo sapiens* but its ancestral species.

In a word, I do not think there is much hope of retaining bits and pieces of the Genesis narrative as history. Nor do I think that there are pressing theological reasons to do so given the sociobiological support for some of the doctrines of original sin. This judgment rests heavily on sociobiology's insights into human nature, the topic to which I turn in the next three sections.

#### SOCIOBIOLOGY AND HUMAN CONFLICT

In the context of this paper, to ask about the origins of human conflict is to ask how sin came into the world, although in the scientific context we must eschew the value judgment implied by the theological concept of sin. How sin got into the world is what the (highly interpreted) Genesis narrative seeks to explain. This question about the origin of sin arises as soon as one posits an omnibenevolent, omnipotent, omniscient Creator and then looks around. However, when starting from a Darwinian perspective, precisely the opposite question arises: How did cooperation get into the world? (I owe the insight for the starkness of this contrast to Oates 1988, 444.) From a naive Darwinian viewpoint, conflict is expected, whereas the existence of cooperation needs explanation.

Naive Darwinian theory is based on individual selection, and although Darwin himself posited group selection to explain the origin of sterile castes in the highly cooperative social insects ([1859] 1964, 235–42), George Williams (1966) showed to almost everyone's satisfaction that group selection is unlikely to occur. Moreover, individual selection does suggest a kind of mutual warfare, and many early Darwinian apologists argued strongly for this interpretation (Oates 1988, 442), as has Williams (1988). The puzzle for Darwinism has been the existence of cooperation within and among species, cooperation clearly evinced in nature in colonial invertebrates, in social insects, in many species of mammals and birds, and in interspecific symbiosis.

In 1964, W. D. Hamilton posited an explanation for the evolution of cooperation that has had an enormous impact on theoretical, experimental, and observational biology. That explanation now goes by the name

*sociobiology*. Hamilton explained in Darwinian terms the evolution of cooperation, or *altruism* as it is technically called. Technically, altruism is behavior that decreases an organism's own chances to survive to reproduce while increasing those of another, helped, animal. There are numerous possible altruistic behaviors, including grooming another animal to rid it of parasites, giving warnings of predators, or feeding one's young.

What Hamilton discovered is that the degree of altruistic behavior is tied to genetic relatedness. Why? According to evolutionary theory, organisms that survive to reproduce pass on copies of their genes to the next generation. However, there is more than one way to have copies of one's genes passed on to succeeding generations. Copies of genes may be passed on directly, as in cloning and in sexual reproduction, or they may be passed on indirectly through close relatives. An organism that helps its relatives survive to reproduce is indirectly passing on copies of its genes through its relatives, for its relatives carry in their bodies copies of its genes, genes technically known as *replica genes*.

Most highly cooperative, altruistic organisms share 100 percent of replica genes. These are organisms that reproduce asexually by division. Organisms having 100 percent replica genes, such as colonial invertebrates, form something like perfect societies, with each organism specialized so that it cannot live without the entire colony. The colony is a kind of organism, with all the parts functioning together to make one unconflicted whole (Wilson 1975, 379). Such is biological paradise, clonal Eden, where there is not much distinction between self and other.

Sexually reproducing species can also be highly cooperative. Well known are the social insects, such as ants and bees. Social ants and bees are *haplodiploid*. In brief, this means that sisters share 75 percent of replica genes and cooperate to raise sisters, forgoing chances to pass on replica genes to daughters because their daughters would carry only 50 percent of their replica genes (for technical details, see Hamilton 1964, 28–35 or Wilson 1975, 415–18). The social insects form castes and colonies. Not being 100 percent related to one another, however, they experience social conflict (Wilson 1975, 379–80).

Other sexually reproducing animals, such as birds and mammals, are *diploid*, meaning that on average their offspring carry 50 percent of their replica genes. As sociobiology predicts, diploid organisms are almost all less cooperative than their haplodiploid or clonal counterparts (Wilson 1975, 380). Because degree of relationship decreases exponentially, cooperation decreases exponentially as well. As the diploid biologist T. H. Huxley famously noted, he would sacrifice himself only for two of his siblings, four of his grandchildren, or eight of his cousins.

Diploid vertebrates' sociality seems to be far less conditioned genetically than that of clonal and haplodiploid organisms. Diploid sociality seems to depend on factors like dietary requirements and the vulnerability of neo-

nates. Some omnivores, such as bears, are almost completely solitary except during the mating season. On the other hand, many carnivores, such as lions and wolves, form groups with strong social bonds. Vertebrates whose young cannot survive without extensive parental care by both parents, as is the case with many species of birds, form strong pair bonds, some mating monogamously for life.

As these observations indicate, sociobiology neither posits nor requires genetic determinism. Strong genetic determinism would mean something like this: Everything an organism is and everything it does is controlled by its genes. Strong genetic determinism is false for almost every organism and almost every behavior. It has been repeatedly falsified.

Hundreds of experiments demonstrate that genes and environments act in synergy. Environments often control genes, as when light or water or diet will activate some genes in some organisms while deactivating others (Moses and Chua 1988; Ricklefs 1973, 59; Greene 1989, respectively). In organisms having culture and reason, additional factors come into play, and sociobiology's ability to predict decreases. Human beings can act in contradiction to evolution's interest in survival and reproduction. (For extended discussions of genetic indeterminism, see Goldsmith 1991, 70–87; Kitcher 1985, 18–29).

Far from being an invitation to genetic determinism, sociobiology is a simplified scientific model based on genetics. Its underlying assumption is that, if all environmental, cultural, and rational factors were invariant, then its predictions would be accurate. The other factors, however, are not invariant. Indeed, the surprise is that such a simple model predicts the occurrence of sociality and of altruistic behavior as accurately as it does.

In diploid organisms, sociobiology predicts 50 percent cooperation among closest relatives, on average, and therefore on the reverse side, 50 percent conflict. Put another way, it predicts 50 percent altruistic behavior and 50 percent self-interested behavior among siblings and between parents and siblings. In brief, it predicts that both cooperation and conflict will occur within the nuclear family. Robert Trivers (1974) is the biologist who first explicitly predicted parent-offspring conflict, and I follow his discussion.

Parents will behave so as to raise as many offspring to reproductive age as possible, which means they must allocate scarce resources among all their dependents by degree of dependency. On the other hand, each offspring will try to get as many resources from its parents as it can. Thus, where resources are limited, and especially where there is more than one offspring, conflict over distribution of resources will arise between parents and offspring. For example, an offspring whose only food resource is its mother's milk will be given milk, whereas a sibling who can nurse but also can survive on solid food will be weaned. However, the older sibling will still seek its mother's milk, for the milk is a nutritious and ready food

supply. So weaning will not be easy. There will be conflict between mother and offspring.

Sibling rivalry will also occur, and for much the same reason. Each offspring will want 100 percent of the resources for itself and only 50 percent for its sibling. Thus, when the same limited resource is the object of attention, conflict will ensue. Parents will try to quell the conflict and encourage equal sharing, for they are equally related to each of the quarreling siblings. Such behaviors have been observed extensively in species after species of diploid animal.

Conflict between the sexes is also predicted (Trivers 1972). In both birds and mammals, the male initially invests very little in his offspring, merely a tiny sperm. The female invests much, providing the relatively large egg and nurture for the unborn. Most female birds brood the nest, and all female mammals provide their young with milk from their own bodies. As a result of her initially large investment, the female has more to lose in evolutionary terms if her offspring perish. Therefore, she is disposed to continue to nourish them until they grow mature enough to be independent of her. The male is less disposed to tie himself down nourishing young when he can easily impregnate other females, thereby producing more offspring and hence more replica genes. A male will, however, bond permanently with a female in circumstances where two parents are required to raise offspring. In these circumstances, males who do not bond do not successfully reproduce offspring who themselves reproduce, and their genes die out of the population.

In less harsh economic circumstances, where the female can raise his offspring herself, the male will seek other mates. The female would do better with his help, however, and will be disposed to try to get the male to stay with her and help nourish their young. In many species, females appear to seek indications that a prospective mate will help. Courting males behave in ways that seem to indicate their interest in their prospective mate's offspring. For example, some must build elaborate nests before the female will mate with them.

Any of these conflicts of interest is likely to produce internal conflicts in the subject animal, and this is especially so where imagination and long-term memory exist. Darwin gives the interesting example of a migratory swallow with two broods per season. The second brood hatches near winter. As her migrating instinct grows stronger than her maternal one, she flies away, leaving her hatchlings to starve. If she had the capacity to remember them and to imagine their plight, she would feel "an agony of remorse" ([1871] 1981, 90-91).

Siblings who are disposed to seek 100 percent for themselves are also disposed to seek 50 percent for their siblings, again raising the specter of internal conflict, the conflict of self-interest over interest in the welfare of others. This idea of being conflicted because of wanting one's own welfare



and one's relatives' welfare at the same time can, of course, be spread beyond conflicts in the nuclear family to conflicts about the welfare of less closely related kin.

Thus far, this discussion has not considered unique human attributes but has been an account of dispositions shared by most diploid social animals. Yet it has discussed major characteristics credited to original sin. All of the animals mentioned are mortal; all suffer pain and disease. They have disharmonious relationships, even among close relatives, and all probably have some degree of internal conflict, although those with the greatest imaginations and long-term memories will be most conflicted. All of these characteristics are inherited, passed on through replica genes. From the sociobiological perspective, original sin looks remarkably unoriginal.

It becomes marginally more original when conflicts between large groups are examined, because such conflicts rarely occur among nonhuman animals, although something resembling warfare has been observed among chimpanzees (Goodall 1990, 90–111). Nonetheless, according to Pierre van den Berghe, conflicts among large human groups are based on kinship ties or those of fictive kinship. His thesis is that ethnic groups are kinship groups, encompassing both the extended family and fictive (or, better yet, symbolic; see P. Williams 1988) extended families. Different ethnic groups use ethnic markers in order to differentiate themselves from other groups—markers such as race, scarification, uniforms, speech, and manners (van den Berghe 1981, 29). Having established who is *us* and who *them*, ethnic groups then compete with one another over scarce resources. Anyone who has read the narrative portions of the Hebrew Scriptures, with their deep concern about kinship and descent and their quarrels over land and symbols, will quickly grasp van den Berghe's point. These writings are filled with competitive warfare as well as its mitigation when those who believe themselves to be descendants of a common ancestor unite under judges or kings.

Conflict, then, seems to be built into genetic structures. There are no specific genes for warlike behavior or for aggression. The genetic basis for conflict is more fundamental than this. It is based on diploidy, and diploidy cannot be eliminated by even the most utopian of genetic manipulations. It is fundamental to human nature.

Using sociobiology, in this section I have addressed the theological question of how sin, or at least conflict, got into the world and have shown how very fundamental it is. Now it is time to turn to the Darwinian question of how cooperation, or goodness, arrived.

#### SOCIOBIOLOGY AND COOPERATION

Whereas the traditional theological problem has been to explain why a world created by a good God contains evil, the Darwinian problem is to

explain how organisms that evolved by individual selection became cooperative. If we look at it naively, individual selection seems to imply a war of all against all. Historically, British Darwinians tended to emphasize the brutality of natural selection, ignoring cooperation, because they were contending against Bishop William Paley's (1743–1805) argument that the apparent careful and benevolent design of nature leads by inductive logic to belief in the Good Designer and the special creation of each species (Oates 1988, 442).

Nonetheless, organisms cooperate, and biologists have observed their cooperative behavior. Biologists observe squirrels and prairie dogs giving warning cries when predators are near. They observe insects with sterile castes in which sisters raise sisters. In birds they observe siblings helping their parents raise younger siblings. And of course they observe parental care. If they had not observed such behaviors, cooperation would not have posed a problem for the theory.

But it did pose a problem, as Darwin saw ([1859] 1964, 235–42). Explaining the evolution of parental care was fairly easy, for it was clear that offspring inherited some characteristics from their parents and that dependent offspring whose parents abandoned them would not carry their parents' genes to future generations. Uncaring behavior would die out of populations with dependent offspring. (For a thorough discussion of the evolution of parental care, see Clutton-Brock 1991.)

Hamilton extended this concept mathematically to include care by close relatives for other close relatives and named the new concept *inclusive fitness*. Helping close relatives, even at some cost to the helper, will tend to pass on copies of the helper's genes, because close relatives carry copies of some of the helper's genes. This is basic genetics. The result is the evolution of altruism, the disposition of organisms to help relatives at some evolutionary cost to themselves. Thus we have the evolution of behavior that is not totally self-interested but rather partially interested in the welfare of others.

However, this simple and obvious conclusion—Hamilton's own conclusion (1964, 1)—is not one all sociobiologists have reached. Some have developed complex versions of Hamilton's theory that have the effect of replacing altruism with selfishness (selfishness, not self-interest). Best known is Richard Dawkins's *The Selfish Gene* (1976). But this interpretation is also given by Michael Ruse (1977; 1986), David Barash (1979), Richard Morris (1983), and Bernard Schwartz (1986), among others. The tendency to argue more generally in favor of an utterly ruthless nature continues as well, as noted above (G. Williams 1988).

Because the tendency to try to derive selfishness from altruism is so common and can be confusing to those not familiar with the wide range of literature on sociobiological altruism, I would like to reach back to Dawkins's very popular book to show how wildly improbable his conclusion is.

The beginning of Dawkins's book states his thesis. His argument will reach from selfishness in genes to selfishness in organisms: "I shall argue that a predominant quality to be expected in a successful gene is ruthless selfishness. This gene selfishness will usually give rise to selfishness in individual behavior" (1976, 2). Even at the beginning, he seems to forget that genes are mere chemical molecules. Chemical molecules are neither ruthless nor selfish. The quality to be expected in a successful gene is replication. Even if genes could correctly be described as selfish, that selfishness would not necessarily give rise to selfish behavior, for behavior is not a gene product but a highly complex result of many factors. But genes cannot be correctly described as selfish, for they work together. To produce an organism, they must work in synergy with other genes. To speak in a metaphor comparable to Dawkins's, they must cooperate.

I know that Dawkins has produced good drama for a popular audience and that metaphors are, well, merely metaphors. However, his metaphors mislead Dawkins himself; by the end of his book, he is looking toward the future of humankind:

We have the power to defy the selfish genes of our birth. . . . We can even discuss ways of deliberately cultivating and nurturing pure, disinterested altruism—something that has no place in nature, something that has never existed before in the whole history of the world . . . we have the power to turn against our creators. We, alone on earth, can rebel against the tyranny of the selfish replicators. (1976, 215)

An exciting, desperate, lonely drama is being waged between people and their genes, between the creatures' possibilities for goodness and their evil creators.

But the drama is false. In this passage, genes have taken the place of God; this is a highly inflated view of chemical molecules. Once genes become God, Dawkins makes them very powerful and very nasty (they are tyrants). Then, of course, we must rebel, for who can tolerate tyranny? This is war. This is also an extremely misleading view of the relationship between people and their genes. Genes are not even the sorts of things with which a person can have a relationship.

A more common mistake is to conflate those who are helped with the helpers and then to claim that the helpers are really helping themselves. Barash says that "the rescuing parent . . . is not really an altruist, since his genes are doing neither more nor less than saving some of themselves" (1979, 133). Genes are people here, making rescues, saving themselves (not copies of themselves—as if an identical twin would be saving herself rather than her sister if she rescued her sister). The father is not an altruist, since his child carries some of his genes; therefore the child is the father, and the father is only helping himself in rescuing his child.

Such confusion permeates much of the sociobiological literature on altruism. More than one person has seen ideology behind these misrepresentations. The least ideological work that deals with possible ideologies

in sociobiology is by Howard Kaye (1986). He is particularly concerned with the religious overtones of work such as Dawkins's. For a brief and clear critique of sociobiologists who are confused about the evolution of altruism, see Langdon Gilkey (1995).

In contrast, many sociobiologists are not confused and understand the ramifications of Hamilton's theory quite well. Among them are George Pugh (1977), Mary Midgley (1978; 1981; 1994), Peter Singer (1981), Jeffrey Murphy (1982), Melvin Konner (1982), Morton Hunt (1990), and Alfie Kohn (1990).

The simplest reply to those who want to explain altruism away is to note that Darwin realized in 1859 that his theory had to deal with the evolution of altruistic behavior in insects (1964, 235–42). The existence of altruism in animals is well attested. It is the problem Hamilton set out to solve, not to explain away.

A more philosophic way to answer is to distinguish selfishness from self-interest from other-interest. Selfishness is equated with taking from others; self-interest looks out for one's own welfare without interfering with others; other-interest is interest in others, a desire of the self for the welfare of another. There are philosophical arguments against the existence of exclusively selfish motives in people (Rachels 1986, 60–64). Some of those arguments have been made from a biological perspective (Sober 1994).

An example of a sociological response is an elegant study that examines the rescuers of Jews in Nazi-occupied Europe (Oliner and Oliner 1988). The rescuers display altruism that extends beyond kinship.

According to sociobiologists, cooperation can extend beyond kinship. Some animals engage in reciprocity. Reciprocal behavior is behavior between nonrelatives that benefits the reciprocating parties about equally. The original paper is by Trivers (1971). Reciprocity, even interspecific reciprocity, has been observed. Famous are cleaner fish and their parasite-ridden companions (Trivers 1971, 40–43). Large fish with parasites will open their mouths and gills to small fish, which then swim in and out eating the parasites on the larger fish. The little fish enjoy a nutritious meal of parasites. The big fish enjoy freedom from parasites; they do not eat the little fish.

This example to the contrary notwithstanding, reciprocity is most frequently found in animals with high intelligence and long-term memory. It is easy to see why. If the relationship is to be reciprocal, then the parties need to be able to recognize each other as individuals, remember each other over time, and also remember having been helped or slighted. The more intelligent animals are, the better they do these things.

Human societies are permeated by reciprocal relationships. Formal reciprocal relationships include promises, employer-employee agreements, legal contracts, and constitutions. At a less formal level, friendships are

marked by reciprocity, as are good neighbor-to-neighbor relationships. Everything from successful professional relationships to lasting car pools rests on it.

Thus sociobiology demonstrates that, while diploid animals are self-interested and conflicted, they also cooperate. Much of that cooperation is driven by altruism, the genetic disposition of relatives to help other relatives at evolutionary costs to themselves. Many things in human society depend on kin-related altruism, not only in the tribal societies of human evolutionary heritage but also in nations, for it is a mark of nations that their people claim common ethnic identities (van den Berghe 1981). However, cooperation also derives from reciprocal relationships, especially among highly intelligent animals such as human beings. Modern states and contemporary societies are dependent on this means of cooperation. For this reason, they emphasize merit and discourage nepotism. In doing so, they make starkly clear the strength of altruism in human life. Nepotism, giving unfair advantage to one's relatives, must be discouraged for justice to prosper.

#### SOCIOBIOLOGY, HUMAN FREEDOM, AND MORALITY

The two previous sections have emphasized the important role that genes play in animal behavior. This emphasis on the role of genes raises the question of human freedom, a question that is central to morality. I begin by borrowing a definition of freedom from Philip Hefner.

Hefner offers a definition of freedom with which almost all sociobiological writers, and many philosophers as well, agree. "By freedom," he says, "I mean the reflective judgment to choose between alternatives that make a difference for our lives and/or the lives of those around us" (1993b, 179). He then quotes Theodosius Dobzhansky to the effect that human beings are "marked by . . . genetically controlled adaptive plasticity, which gives us great ability to scan our environment and choose behaviors appropriate to it" (1993b, 179).

According to Timothy Goldsmith, killdeer (birds) have some such capacity, as they behave so as to defend their ground-level nests. Faced with predators, they exhibit broken wing behavior. They distance themselves from the nest and act as if they have a broken wing to attract the attention of the predator, which they then lead away from the nest. If the predator does not notice, they fly on unbroken wing to another position and try again. However, in the face of a nonpredatory threat, like a cow that might step on the nest, they react in a different manner, staying close to the nest and being conspicuous so the cow will avoid the nest. As Goldsmith comments, "This process of defending the nest requires the central nervous system of the bird to assess a stream of sensory information and generate a variety of behavioral responses. In short, the killdeer must make a number of decisions" (Goldsmith 1991, 113).

He does not mean the birds make conscious decisions. But consciousness is not necessary for making decisions, as computer users know; rather, what is needed are alternatives that matter, or, in Hefner's words, "that make a difference for our lives and/or the lives of those around us." If the alternatives are to matter, the organism must have values built into it.

For biological beings, values are built in through phylogenetic heritage. As Goldsmith notes, the human brain is composed of several structures, some older than others. The limbic system and hypothalamus are old. These systems control automatic, unconscious processes such as the balance of salt and water in the body and changes in heart rate, but they also produce very basic biological behaviors over which people have conscious control, such as eating, drinking, fleeing, and copulating. The cortex and neocortex, which are involved in memory, thought, and language, are new. These old and new brain structures must work together. Messages arriving from the hypothalamus and limbic system require decisions between alternatives made at the neocortical level (Goldsmith 1991, 105–9). For example, a thirsty animal must decide whether to face danger from predators by approaching a water hole or to go on being thirsty.

Such a decision rests on values built into the organism. Because values are built into people genetically, human beings are not enslaved by their environments. Thus, as Midgley (1994) argues, the existentialist idea that people start with nothing and create their own values does not provide for freedom but rather enslavement to the environment. Agreeing with her, Mary Maxwell notes: Freedom "is better provided for when it has some genetic base" (1984, 345).

So, genetic dispositions are necessary for making decisions and for freedom from the allure of the environment. Genetic dispositions do not enslave, however, for they are not singular and orderly but conflicted. If they were not, there would be no decision to be made, because people would choose the one thing they wanted and only that. But they do not choose singly, because evolution has provided for plenty of conflict among natural dispositions. Conflict arises between the needs of an organism and the fulfillment of its needs by interaction with an environment that does not readily supply them. It arises in predator-prey relationships. It arises in social relationships between diploid relatives. It arises in other interspecific relationships in diploid animals. And it arises because evolution itself is not an engineer, not a watchmaker, but a tinkerer (Jacob 1977). A new species does not arise from a fine design but is cobbled together from phylogenetic remnants that cannot be altered too drastically without killing the organisms. This why human beings have a brain that is both ancient and modern.

Because human beings have long-term memory, foresight, imagination, and the ability to self-reflect, they are more conflicted than other animals. Consequently, they are freer. Consider again the killdeer. It nests on the

ground. It has experiences with predators and with large animals that might inadvertently crush its young. It chooses how to deal with these within narrow parameters, without long-term memory and without much foresight. If it had these, it might ponder its situation, envision a future for itself and its brood, and decide to nest in a tree, getting its young above the threat of fox and cow. There it would face other hazards, such as restless, featherless young tumbling from the nest. It might foresee this, feel deeply the conflict between death by fox or death by fall, and be torn between options. But it would be freer than the current killdeer. It would be more human.

There is an interplay here. Conflict increases freedom; freedom enhances conflict. To be freer is to have more options, and to have more options means possibly having conflicts heretofore unimagined. What Hefner calls "a new stage of freedom" (1993b, 32) with the evolution of human beings is also a heightened situation of conflict. In its freedom, humanity is beset by conflicts. Sometimes people flee from conflicts and decisions, overwhelmed by the possibilities and the responsibilities. If conflict enhances freedom, and freedom increases conflict, what can provide freedom from conflict?

Perhaps the most general answer is rules. Making rules means sorting out priorities, deciding which values are of general importance and which will apply in particular situations. This is an abstract description of human morality. Almost everyone who has worked in the area of human sociobiology, from Darwin to contemporary authors, has held that morality and its arbiter, conscience, are natural products of evolution that help resolve conflicts of interest for individuals and for collectives. Most have also thought that human reason is part of moral equipment. Most also recognize the role of culture, yet they believe that cultural priorities are directed by minds that have innate values (Wilson 1978, 53–70; Ruse and Wilson 1986, 180; Midgley 1994, 172). Human values are not arbitrary. People do not recognize as moral leaders those who claim that what matters most is not to step on lines in the sidewalk; rather they look to those who bring attention to pain and misery and provide ways to alleviate them (Midgley 1994, 153).

Although almost all sociobiologists accept this general view, they have taken three somewhat different approaches to the evolution of morality. Some, such as Richard Alexander (1987), have emphasized reciprocity. Alexander argues that people have evolved so as to serve their reproductive interests, leading to relationships of inequality and conflict. These inequalities and conflicts are resolved by emphasizing reciprocal relationships instead of reproductive ones, for reciprocal relationships tend toward equality. He sees religion, science, law, and monogamy all as leading in the moral direction of human equality.

In contrast, Peter Singer (1981) and John Cobb Jr. (1988) have emphasized altruism. Singer argues that biological altruism lies at the basis of the human caring emotions and that this is where morality starts. However, impartial reasoning, the type of reasoning considered to be moral reasoning, is also required to settle disputes that naturally arise. Singer thinks that natural caring is seen by impartial reason to extend beyond family to all human beings and even to other animals. He does not suppose, however, that reason alone will prompt human beings to act morally but argues that rules and institutions need to be developed to help people expand their caring beyond the circles of kin and clan.

Last and most common are those who emphasize the evolution of conscience. Darwin discusses it at length ([1871] 1981, 70–84), as do contemporary authors including Robert Richards (1986), Ruse (1986), Maxwell (1990), and Midgley (1994). Despite some glaring differences, they all agree that conscience is a product of evolution; that those who had it survived the vicissitudes of individual, kin, and intergroup conflict better than those who did not; that it appears to have some sort of objective status; and that it is necessary for human life. Whereas Ruse thinks its apparent objectivity is an illusion created in us by human genes so that people will obey it (1986, 252–56), Midgley has a more naturalized view, holding that the conscience's demands actually do come from outside, that is, from outside immediate human impulses, and that they are ordered so that a human being can behave as a single entity rather than an irrevocably conflicted multiplicity (1994, 168).

Another possible way that human beings resolve conflict is the development of culture (Burhoe 1988; Hefner 1993b), a development that, of course, hardly excludes morality. Instead of emphasizing reciprocity or altruism or conscience, however, both Burhoe and Hefner emphasize the symbiotic relationship between biology and culture and claim that culture generally is an enabling mechanism for biology, for if it had not been, it would have died out. Culture transmits values. For Hefner, the values are transmitted by religion, ritual, and myth. Sociologists, of course, have long argued that religion, ritual, and myth provide values and social cement as well, but they have largely ignored the symbiotic relationship between biology and culture that Burhoe and Hefner stress.

Now I will try to weave together the various strands in this section. It began with the notion of freedom as involving the reflective ability to choose between meaningful alternatives. But having alternatives means that there will be conflicts among them, and the more alternatives, the more conflicts there will be. People are endowed with long-term memory, imagination, foresight, and self-reflection. Consequently, they have more alternatives and more conflicts than do other animals. But this also means they have more freedom. Sociobiologists have proposed that morality, conscience, and culture evolved as a way to deal with this enhanced freedom.



Before I begin the final section, it may be wise to review the argument so far. First, I maintained that original sin has two different and separable meanings, one the first sin of Eve and Adam, the other a doctrine of human nature. I argued that there was no first sin in the sense of the first sin of a primeval pair.

I then tried to adumbrate a theory of human nature based on the science of sociobiology rather than on the Adamic narrative. That theory says that human beings are self-interested, selfish, and conflicted because of their general genetic makeup but that they are also cooperative, altruistic, and caring for the same reason.

Finally, I argued that the conflicted state of human beings supplies the foundation for human freedom and that morality provides a solution to the conflict. In brief, this is sociobiology's scientific theory of human nature. Now it is time to turn to the Christian doctrines of original sin. Here sociobiology will be used as a critical tool, judging the accuracy of these doctrines' understanding of human nature. I hope that this critique will lay the foundation for an understanding of original sin that will become common to all Christian churches.

#### SOCIOBIOLOGICAL CRITIQUE OF THE DOCTRINES OF ORIGINAL SIN

Augustine (354–430) coined the term *original sin* to refer both to Eve and Adam's first sin and to the state or condition in which humanity finds itself. He never sorted out the conflation of personal with original sin (McBrien 1994, 187–88). I argue that the first sin, Eve and Adam's deed, is not historical and that there is therefore no original sin as first sin. I also argue that the state or condition into which all human beings are born, which Augustine also termed *original sin*, is natural and basic to humanity. From a sociobiological point of view, this state cannot rightly be judged sinful, for science cannot make this sort of value judgment. That this state is sinful is a theological judgment that needs examination.

The doctrines of original sin generally tend to say that the human state is the fault of the primeval pair and, through them, of all humanity. These doctrines emphasize that the current human state is one of susceptibility to disease, inevitability of death, constancy of conflict, loss of freedom, and tendency toward immorality. In general the sociobiological viewpoint differs from these doctrines on the first point, for since there was no primordial sin, the human state is not humanity's fault, and it also disagrees with the last two points, seeing human beings as remarkably free and naturally inclined toward developing ethical rules for themselves.

I begin my critique of the doctrines of original sin by arguing that they are neither biblical nor patristic. That they are neither is important for Christians who look to scripture or to scripture and early tradition as the

sources of their faith. Knowing that the doctrines are neither biblical nor patristic frees Christians to examine them rationally and critically.

For any doctrines of original sin to have been intentionally part of the account of the Fall in Genesis 2:4b–3:24 would be an anachronism. This narrative is thought by scholars to have been written down at about the time of Solomon, 1000–900 B.C.E. (Pagels 1989, xxii), based on earlier oral traditions. Yet no one on record connected the Fall with the condition of humanity until after the Babylonian Exile of 586–539 B.C.E. Therefore the author of the account of the Fall would not have had the cultural equipment to make the Fall an account of original sin.

Nor are the doctrines in the Hebrew Scriptures (Tennant [1903] 1968, 1–105). Indeed, there is a rabbinic tradition that runs counter to the idea that evil entered the world at the Fall. This is the tradition of the evil inclination, the *yetzer hara*, which was in Adam from the first (Urban 1986, 133).

The Gospels do not refer to the Fall. Jesus never mentions it (Urban 1986, 134) and only once alludes to Eve and Adam, the context being the prohibition of divorce (Matthew 19:3–9). Although Jesus is certainly concerned with human evil, he does not connect it with the Fall (Urban 1986, 134).

The doctrines of original sin are not unequivocally in Paul (Urban 1986, 134–37; Tennant [1903] 1968, 249–72). Paul does not investigate the psychological origin of sin. A person “commits sin because he is sinful. But why he is sinful the Apostle nowhere explains” (Tennant [1903] 1968, 269). As well, Paul seems to have various roots for sin. For example, in Romans 1:25–31, idolatry is the root of sin. In Ephesians 4:18–19, alienation from God is the foundation of sin (Urban 1986, 134–37).

Finally, the doctrines are not found in the early church fathers (Urban 1986, 137). The early church was not culturally in a position to develop such doctrines. Rather, the early church had to fight against the pagan concept of fate, whereby human beings are helpless pawns of astrological forces. Jaroslav Pelikan comments that fate took such a strong hold over the pagan mentality that “the emperor Tiberius [42 B.C.E.–37 C.E.] stopped paying homage to the gods because everything was already written in the stars” (1971, 281). Its fight against fatalism led the early church to emphasize human responsibility and freedom of the will (Pelikan 1971, 279–84) rather than human bondage. Likewise, its battle against Manichaeism and Gnosticism, both declaring the evil nature of matter, led it to emphasize the elevating and transforming nature of the Incarnation (McBrien 1994, 187) rather than human sinfulness.

There are, of course, elements in Paul and in the early church fathers that contributed to the later doctrines. Origen sees Adam as a cause of sin, Tertullian contributed the idea of inherited sinfulness, and Ambrose developed the concept of sin as a state rather than an act (Tennant [1903]

1968, 273–343). However, it was Augustine who coined the term *original sin* and, in his battle with the Pelagians, developed the doctrine that so influenced Western theology.

Pelagianism was eventually declared heretical and is no longer part of mainstream Christianity, yet it is worth treating here for three reasons. First, it is the set of doctrines against which Augustine reacted, and so it influenced him. Second, many of the early Greek fathers held ideas similar to the Pelagians' (Hefner 1993a, 83–84), so something that might be called Pelagianism influenced the Orthodox church. Third, treating it gives balance to this essay theologically, for Pelagianism takes a naturalistic and optimistic view of human nature not present in the other doctrines.

In addition to Pelagianism, I will critique the doctrines of original sin in the three major branches of Christianity still in existence: Protestantism, Orthodoxy, and Catholicism. To make the material amenable to sociobiological treatment, I have arranged the critique around five themes: disease and death; the transmission of original sin; conflict and concupiscence; freedom; and cooperation, morality, and grace. The first two have been important theologically, but in the light of sociobiology their importance declines. The last three coincide very closely with the divisions of sociobiology made above. They are central both theologically and sociobiologically. I begin on the minor notes.

*Disease and Death.* On disease and death there is almost unanimous agreement. In Eden, Eve and Adam were free of disease and death. After the Fall, and as a consequence of it or punishment for it, they and their progeny are subject to both. Only the Pelagians disagree. They argue that physical disease and death are natural and that the consequences of the Fall are not physical decrepitude and death but moral deterioration and moral death (Pagels 1989, 132). Sociobiology sides with the naturalistic Pelagians. Disease and death are part of the natural world, inherent in the lives of all organisms. Disease and death existed for all organisms from their beginning, a beginning long before the evolution of humanity. Human beings acquired them as part of their biological heritage. Disease and death are not punishments from God for human sin. Augustine's view that all of nature suffered at the Fall (Pagels 1989, 133) seems particularly erroneous on a modern view of biological history, which holds that billions of individual organisms died and millions of species went extinct before humanity appeared.

*The Transmission of Original Sin.* Pelagians think that original sin is transmitted by example and by imitation, which in contemporary terms would mean cultural transmission. Orthodoxy proclaims a "mysterious unity of the human race" (Ware 1993, 223) so that all humanity is affected by the sin of one person, Adam. Catholicism holds a similar view, speaking of the "unity of the human race" and admitting that the "transmission

of original sin is a mystery that we cannot fully understand" (*Catechism* 1994, 102, no. 404). Yet in its opposition to Pelagianism it goes further and comments that "original sin is transmitted with human nature, 'by propagation, not by imitation'" (*Catechism* 1994, 105, no. 419). Augustine holds an even stronger position, namely, that original sin is transmitted in lustful sexual intercourse. He also emphasizes the unity of humankind in Adam. In this he was particularly influenced by his Vulgate (Latin) translation of the New Testament. In Romans 5:12, where Paul's original Greek reads (in English), "sin came into the world through one man . . . because all men sinned," the Vulgate reads (in English), "sin came into the world through one man . . . in whom all men sinned" (emphasis added; see Pelikan 1971, 299; Urban 1986, 134–37), as if all people somehow preexisted in Adam.

Sociobiology understands that human behavioral dispositions as well as bodily attributes can be transmitted sexually and that diploidy is genetic. Because diploidy is genetic and genes are transmitted sexually, human dispositions toward both selfishness and altruism have a genetic base and are sexually transmitted. In this view, although it would not deny cultural influence, sociobiology sides with Catholicism and Augustine against Pelagianism. However, because it has nothing to say about the goodness or badness of sexual appetite, it looks askance at Augustine's equation of sexual passion with original sin. Its position is closest to that of Catholicism, for Catholicism seen propagation as a means for transmitting original sin, but it does not equate lust with original sin (*Catechism* 1994, 102, no. 405).

Sociobiology would not posit some sort of mysterious unity for humanity but would merely include humanity among other biological species and inquire into the unity of *Homo sapiens* with tools that apply generally to biological species. Interestingly enough, this does not militate against treating *Homo sapiens* as highly unified. Modern philosophical work on the nature of biological species has leaned toward treating species as individuals, not as sets or classes (Hull 1976; Ruse 1981; Ghiselin 1987). This work has tended to emphasize the unity of each biological species, including humankind. But of course this does not suggest unity in Adam, for Adam was not a historical figure.

*Conflict and Concupiscence.* All four theologies hold that human beings in Eve and Adam were created without conflicts. I will let the *Catechism* speak for all positions (some of the language is peculiar to Catholicism, but the concepts are not).

The first man was not only created good, but was also established in friendship with his Creator and in harmony with himself and with the creation around him. . . . Man would not have to suffer or die. The inner harmony of the human person, the harmony between man and woman, and finally the harmony between the first

couple and all creation, comprised the state called “original justice.” . . . The first man was unimpaired and ordered in his whole being because he was free from the triple concupiscence that subjugates him to the pleasures of the senses, covetousness for earthly goods, and self-assertion, contrary to the dictates of reason. (*Catechism* 1994, 95–96, nos. 374, 376, 377)

All are agreed on an original harmony at the beginning, internally, socially, and with God.

All also agree that human beings are now conflicted, internally, socially, and with God, and they connect that conflictedness with concupiscence. Unfortunately, they do not agree on the meaning of *concupiscence*. Augustine connects it most explicitly with the lust involved in sexual intercourse and with original sin (McBrien 1994, 187), although he is ambiguous in his usage (Vandervelde 1981, 17). Catholicism sees it as a person’s prereflective natural desires moving toward either good or evil (McBrien 1994, 1236), whereas the Protestants see these prereflective desires themselves as sin offensive to God (Cross 1957, 324). Writing as I am from a scientific perspective, I will not judge concupiscence with the Protestants but rather define it neutrally as spontaneous desire for temporal goods (see Cross 1957, 324; McBrien 1994, 187). Although taken directly from theology, this definition places concupiscence readily within the realm of sociobiology, for the desires to mate and to garner resources could certainly be considered spontaneous desire for temporal goods.

For the Pelagians, sexual desire is natural and existed from the beginning of creation. People are well ordered and come into conflict only when they follow the bad example of their progenitor, Adam. In Adam after the Fall, the original harmony is fragmented and the image of God is obscured. Subsequently, they are fragmented and obscured in all people because of the example of Adam. Adam’s example leads all people to engage in sin as a habit, and “by force of habit, sin attains a power akin to that of nature—sin becomes as it were “second nature” (Vandervelde 1981, 12). So the tendency to sin is there, yet people have a good nature, capable of choosing and doing good (Vandervelde 1981, 12).

The Orthodox church follows the early Greek father Irenaeus in conceiving of Eve and Adam as childlike, simple, and immature. As a result, Orthodoxy minimizes Adam’s sin and, concomitantly, God’s judgment. (In this discussion, I follow Ware 1993, 221–25.) It holds a view similar to that of the Pelagians, namely, that the image of God is distorted by sin but not destroyed. Furthermore, however, the will itself is weakened by concupiscence so that the Fall is not merely a bad example but directly affects human nature. At the Fall, human nature is wounded in Adam and all his posterity. It is sufficiently wounded that people cannot save themselves, as in some interpretations of Pelagianism.

The Roman Catholic tradition is similar to the Orthodox in holding that concupiscence is a consequence of the Fall. Likewise, it is similar in

holding that the Fall affected human nature itself, wounding it sufficiently that people apart from God cannot save themselves. Catholics tend to see original sin as a loss, a lack of sanctifying grace, the absence of the divine indwelling (McBrien 1994, 188), a deprivation of original holiness and justice (*Catechism* 1994, 102, no. 404). Thomas Aquinas (c. 1225–1274), still the central theologian for Catholicism, has a thorough discussion. He writes of a hierarchical state of original justice before the Fall. The hierarchy is tripartite: humanity submits to God in reason and will; the nonrational parts of a person submit to reason; a person's body submits to the soul (Aquinas [1265–71] 1954, 123, I.82.3; also see Vandervelde 1981, 28). The Fall releases natural human drives from their original balance into unbalance and conflict (Aquinas [1265–71] 1954, 120, I.82.1). The natural inclination to virtue is weakened, for sin interferes with a person's attainment of virtue. Original justice, a person's right relationship with God (Urban 1986, 150) and due subordination, is entirely lost.

Augustine differs from all of the above in various ways. In his later writings, he holds that Adam was created perfect, a view that makes the Fall an awful act of inexplicable ingratitude, an "unspeakable sin" (Urban 1986, 140). In Eden, Eve and Adam are totally without concupiscence; their sexuality is under the control of their wills, even as the movements of human hands and feet are under control of the will (Augustine [413–26] 1984, 585, XIV.23). Since Adam's sin is so egregious, God's punishment is concomitantly great. Concupiscence, especially lust, is not merely a consequence of the Fall; it is the punishment that God hands out. God forsakes humanity (Augustine [413–26] 1984, 523, XIII.15); Christ's image is no longer in the soul (Rigby 1987, 124). Because humanity is abandoned, it is damned, living "a life of harsh and pitiable slavery" (Augustine [413–26] 1984, 575, XIV.15). It is lost in total, damning self-love (Vandervelde 1981, 15–20).

Sociobiology naturalizes concupiscence and does not judge it. Concupiscence as sexual desire is common to all mammals, including *Homo sapiens*. Sociobiology predicts that sexual desire will be strong, for what evolution rests upon is survival in order to reproduce. Reproduction is the engine of evolution. To claim as Augustine does that it was once under the control of the rational will seem erroneous, even humorous. Other desires are also natural, insofar as all animals try to garner resources and to compete successfully with others of their species in order to survive to reproduce. Here the sociological viewpoint seems close to both Judaism and Catholicism. The rabbis posit an inclination which is in humanity from the first, which is at the root of sexuality and competition, but which can become directed toward evil ends, and so, although part of God's good creation, it is nonetheless viewed as the evil inclination (Wyschogrod 1986, 127–28). Catholicism speaks of concupiscence as natural impulses that move people toward good or evil before they have had time to engage in

moral reflection (McBrien 1994, 1236) but also speaks of it as “an inclination to sin” (*Catechism* 1994, 322, no. 1264).

If sin is conceived of as misdirected or exaggerated desire, then sociobiology tends to substantiate the Judeo-Catholic position. Natural dispositions that enable animals to survive to reproduce can become radically distorted. Midgley (1978, 262–63) borrows some examples from the famous ethologist, Niko Tinbergen. My favorite is of a bird, the oyster catcher. Like most birds, it broods its eggs. However, it will abandon its own eggs and brood a giant, artificial egg when tempted by curious ethologists. When temptation summons, fundamental natural dispositions can go awry.

Sociobiology would look askance at both the Pelagians and Augustine. The Pelagians seem too sanguine, as if people must see examples of conflicts before they will engage in them, as if they do not have the deep internal conflicts that sociobiology posits as being a part of human nature because human diploidy pulls a person toward both self and others.

In contrast, Augustine’s position seems both too pessimistic and too single-minded. It is too single-minded because diploidy produces a self divided, divided between self-love and other-love, not driven by relentless self-love. And although diploidy provides a foundation for conflict, it also provides for willing cooperation among relatives. In addition, human reciprocity is common. It is founded upon human rationality, a rationality that considers others as well as the self (for an interesting discussion, see Singer 1981).

*Freedom.* The doctrines of original sin seem inconsistent with sociobiology’s understanding of human freedom. For sociobiology, conflict is seen as the foundation from which choice arises and without which choice is hardly possible. Morality is rooted in conflict and the choices it provides. In contrast, in all of the theological positions, a person in conflict is less free than the unconflicted, pre-fallen Adam. Least free are those who engage in actual sins necessarily, as in Augustine (Vandervelde 1981, 18). In Augustine, if people are free, they are free only to sin, and so the free will is in bondage (Vandervelde 1981, 18). On the other hand, Pelagianism, Orthodoxy, and Catholicism all emphasize free will, despite the loss of freedom at the Fall.

From a sociobiological and even logical perspective, this is confusion on a large scale. In order to make sense of it, sociobiology must assume a theological orientation. The theological arguments turn not on freedom of choice in general but rather on freedom to choose what is good. For example, Augustine does not see humanity as free to sin but as enslaved by sin, because human beings alone cannot perform good acts. In contrast, the Pelagians see people as capable of choosing good and doing good (Vandervelde 1981, 12). Indeed, what George Vandervelde refers to as “the factual bone of contention” (1981, 15) between the Pelagians and Augustine is the Pelagians’ doctrine of natural grace leading to a human

nature that is capable of doing good, contrasted with Augustine's belief that God has abandoned humanity and that therefore humanity necessarily sins (unless it is gratuitously given supernatural grace).

Free will for the Orthodox is what enables people to cooperate with God (Ware 1993, 221). For Catholics, "freedom [is what] God gives to created persons so that they are capable of loving him and loving one another" (*Catechism* 1994, 97, no. 387), as cooperative a position as the Orthodox. From a theological point of view, then, freedom is not free choice per se but freedom to choose to do good, or, in Orthodox-Catholic thought, freedom to choose to cooperate with God (to do good). This theological orientation is difficult to translate into sociobiological terms. However, sociobiology can accommodate the theology, for it can address freedom as freedom to love or to do what is good.

*Cooperation, Morality, and Grace.* To the Pelagians, nature and grace coincide, for there is natural grace, a grace inherent in humanity's created nature, a nature created good whose goodness is distorted but not lost at the Fall. Therefore, fallen humanity is free to do good without having special or supernatural grace.

Similarly, in Catholicism nature and grace are not sharply separated (McBrien 1994, 182–83). Humanity has a radical capacity for grace that is part of its nature. Catholicism posits a cooperative relationship between God and human beings (for a fine discussion, see Stump 1989). Through their cooperation with God, people are redeemed from within, actively changed (McBrien 1994, 192). This emphasis on interior change is unique to Catholicism. Because of this emphasis, Catholicism speaks of salvation in terms of conversion continuing over a lifetime, with the possibility of profound interior transformation. It also speaks of graced human beings as able to perform meritorious works (*Catechism* 1994, 486–87, nos. 2008–11).

Orthodoxy, too, holds that humanity retains some of its pre-fallen nature. As a hymn in the Orthodox funeral service puts it, "I am the image of Your inexpressible glory, even though I bear the wounds of sins" (quoted in Ware 1993, 224). Orthodoxy also emphasizes that people must cooperate with God to attain their salvation: "God knocks, but waits for us to open the door—He does not break it down" (Ware 1993, 222). In contrast to Catholicism, however, God's grace is not within but acts on people only from without.

For Augustine, nature is without grace. All grace is supernatural, exterior grace, given by God gratuitously, apart from human cooperation and without human merit. Natural human beings are totally selfish, without the ability to love anyone but themselves. They can do no good works.

Sociobiology finds itself in an awkward position here. It can reject Augustinianism quickly, because its own genesis stems from the observation that cooperation exists naturally among social animals, including people. Familial cooperation occurs throughout nature.



However, it cannot speak of grace. It does not have the concept, and it cannot borrow it, for grace is not a scientific notion. Moreover, sociobiology has no need to invoke grace as an explanation of most cooperative behavior. Nonetheless, in trying to bridge the gap between sociobiology and theology, I think sociobiology must allow for the possibility that nature is graced (also see Hefner 1993b, 62, 229–31). Altruism toward kin is a natural human disposition, and, if one were to speak of it theologically, it could be considered graced, for it is the disposition that enables people to reach beyond love of self to love others. If people were as selfish as Augustine claims, they would not be able to love either God or their neighbor. With kin altruism, however, they can do both. Not only can they love their immediate kin, but, because they are symbol-wielding creatures, they can invest those who are not close kin with the attributes of kinship. This is what people do (P. Williams 1988). The New Testament uses symbolic kinship terms for God (father), for Christ (brother), and for other people who have become Christians (brothers and sisters).

Reciprocity might also be considered graced, for it, too, must look in part toward the other, both neighbor and God. With their emphasis on contractual relationships (covenants), the Hebrew Scriptures stress reciprocity in the relationship between God and God's people. Furthermore, as Midgley (1994, 146–47) notes, reciprocal cooperation is not coldly rational, for friendships and broken relationships matter deeply to people, as the Hebrew Scriptures highlight in their concern with reconciliation between God and God's people.

Sociobiology, however, does not share what sometimes seems to be the blithe optimism of the Pelagians. Humanity is also deeply selfish. Reciprocal relationships invite cheating (Trivers 1971, 45–52). Familial and clan relationships involve strife (Trivers 1974; van den Berghe 1981, respectively). Seen through sociobiology's lenses, natural grace does not get humanity much further than loving another about half as much as oneself.

On the other hand, there are data about human cooperation which sociobiology cannot explain. It cannot explain cooperative behavior that is based neither on kinship nor on reciprocity. Thus, it cannot explain dying for a cause when the hero is not helping close relatives, and it cannot explain helping nonrelatives when there is no reciprocity or extrinsic reward involved, as with the rescuers of Jews in Nazi-occupied Europe (Oliner and Oliner 1988). Maybe there are cultural explanations. Perhaps there is cooperation between a person and God. Possibly that cooperation leads to an interior transformation. Conceivably there is supernatural grace.

*Summary.* In this section, I have tried to use sociobiology to critique four doctrines of original sin under five headings: disease and death; the transmission of original sin; conflict and concupiscence; freedom; and cooperation, morality, and grace. For the four doctrines, the result has

been mixed. Sometimes Pelagianism receives support; less frequently Augustine is upheld, at other times Orthodoxy or Catholicism seems best. This mixed result is not surprising, for the attempt to apply science to theology is unlikely to end up supporting any single position. Indeed, if it did, I would suspect the hidden hand of ideology to have been at work. This makes me think more strongly than ever that the hidden hand of ideology has been at work in the misinterpretation of sociobiology which concludes that people are utterly selfish, for such a view would support Augustinianism to the exclusion of all the other doctrines of original sin.

#### CONCLUSION

In 1950 Pope Pius XII issued an encyclical that dealt in part with the theory of evolution. Regarding human beings, he thought the evolution of the body to be an open question. However, in order to protect the doctrine of original sin, he insisted on a historical Adam who committed a historical deed, for original sin is "a quality native to all of us, only because it has been handed down by descent from [Adam]" ([1950] 1956, 287). In context, his concern is clear. He wants to assert that all people are equally stained by original sin, and the only available evidence behind this assertion is that human beings are children of Adam.

I think this paper makes other evidence available, answering the pope's concern without positing a historical Adam who committed an actual deed. Sociobiology describes human beings who are concupiscent. They have spontaneous desires for temporal goods, that is, they seek mates and resources that enable them to survive to reproduce children who can also survive to reproduce. Sociobiology describes people who are conflicted. Being diploid, they care both for themselves and for their relatives. This means that they are free to act in their own self-interest as well as in the interests of another. It also means that human dispositions are not equally balanced between self and other. Rather, people consider themselves first, and their cooperation is channeled toward relatives. Their care for kin and clan is strong. It is also dangerous, insofar as it leads people to make distinctions between *us* and *them* and to fight with *them*.

Reciprocity can overcome this danger, for it puts people on an equal footing of equal exchange. However, it is weakly motivating. If it were not, people would not need to make laws against nepotism in order to establish justice.

This is the human state. Because it did not originate in human sin, humanity bears no guilt for it. Because it did not originate in disobedience, it cannot logically be a punishment from God. Its not being seen as punishment largely erases from Christianity the picture of a jealous, punitive deity.

But is it sinful? Sociobiology has no answer to this question, for it has no concept of sin. It certainly says that people are concupiscent, that is,

that they have spontaneous desires for temporal goods like mates and resources. Because people need such goods, it is difficult to find sin here, although if people begin to resemble the oyster catcher in their desires, as they often do, then their desires become inordinate, even from the perspective of evolution. From three of the four theological perspectives, inordinate desires are sinful but concupiscence is not (Augustine is the exception).

Christianity has a more general concept of sin. It says that the whole of the moral law is fulfilled if people love their neighbors as themselves (Matthew 22:37–39; Romans 13:8–10). Not to fulfill the moral law is to sin. If this is so, then the human state as adumbrated by sociobiology is sinful, for on this view all people are born into a state such that they do not naturally love their neighbors as themselves. Rather, the closest they come naturally is to love themselves completely and to love their nearest relatives half as much. For nonrelatives, there is no natural love. There is reciprocity, an equal exchange, but this does not fulfill the Christian law, for Christianity demands not bargaining and equal exchange but giving freely and loving enemies (Matthew 5:38–48).

I end with three suggestions. The first is that, if the sociobiological analysis of human nature is correct, then natural humanity does not know the moral law, for it listens primarily to its innate dispositions. Therefore to know the moral law it needs either reason or revelation or both. Second, natural humanity is sinful in God's sight, for it is not disposed to fulfill the moral law. Therefore humanity needs to be moved beyond its natural state to be reconciled with God. In theological terms, it needs atonement. Third, on their own, people cannot fulfill the moral law, for self-interest and nepotism predominate, undermining individual efforts and political institutions. People need help. In theological terms, they need grace. However, people no longer need a story about Adam's disobedience to tell them these things. They can find knowledge of these things in science.

#### NOTE

I would like to thank Philip Hefner, who read a very long abstract of this paper and offered support, suggestions, and encouragement toward my writing the full-length essay.

#### REFERENCES

- Alexander, Richard D. 1987. *The Biology of Moral Systems*. New York: Aldine de Gruyter.
- Aquinas, Thomas. [1265–71] 1954. *Nature and Grace: Selections from the Summa Theologica of Thomas Aquinas*. Translated and edited by A. M. Fairweather. Philadelphia: Westminster Press.
- Augustine. [413–426] 1984. *Concerning the City of God against the Pagans*. London: Penguin Books.
- Barash, David. 1979. *The Whisperings Within*. New York: Harper and Row.
- Bradie, Michael. 1994. "What Does Evolutionary Biology Tell Us about Philosophy and Religion?" *Zygon: Journal of Religion and Science* 29 (March): 45–53.

- Burhoe, Ralph Wendell. 1988. "On 'Huxley's Evolution and Ethics in Sociobiological Perspective,'" by George C. Williams." *Zygon: Journal of Religion and Science* 21 (December): 417-30.
- Cann, Rebecca L. 1987. "In Search of Eve." *The Sciences* 27:30-37.
- Catechism of the Catholic Church*. 1994. Mahwah, N.J.: Paulist Press.
- Clutton-Brock, T. H. 1991. *The Evolution of Parental Care*. Princeton, N.J.: Princeton Univ. Press.
- Cobb, John B. Jr. 1988. "Befriending an Amoral Nature." *Zygon: Journal of Religion and Science* 23 (December): 431-36.
- Cross, F. L., ed. 1957. *The Oxford Dictionary of the Christian Church*. London: Oxford Univ. Press.
- Darwin, Charles. [1859] 1964. *On the Origin of Species*. Cambridge: Harvard Univ. Press.
- . [1871] 1981. *The Descent of Man, and Selection in Relation to Sex*. Princeton, N.J.: Princeton Univ. Press.
- Dawkins, Richard. 1976. *The Selfish Gene*. New York: Oxford Univ. Press.
- de Waal, Frans. 1989. *Peacemaking among Primates*. Cambridge: Harvard Univ. Press.
- Degler, Carl N. 1991. *In Search of Human Nature: The Decline and Revival of Darwinism in American Social Thought*. New York: Oxford Univ. Press.
- Diamond, Jared. 1992. *The Third Chimpanzee: The Evolution and Future of the Human Animal*. New York: HarperCollins.
- Ghiglieri, Michael P. 1988. *East of the Mountains of the Moon: Chimpanzee Society in the African Rain Forest*. New York: Free Press.
- Ghiselin, Michael T. 1987. "Species Concepts, Individuality, and Objectivity." *Biology and Philosophy* 2:127-43.
- Gibbons, Ann. 1991. "Looking for the Father of Us All." *Science* 251:378-80.
- Gilkey, Langdon. 1995. "Biology and Theology on Human Nature." In *Biology, Ethics, and the Origins of Life: An Introduction*, ed. Holmes Rolston, III, 167-90. Boston: Jones and Bartlett.
- Goldsmith, Timothy H. 1991. *The Biological Roots of Human Nature: Forging Links between Evolution and Behavior*. New York: Oxford Univ. Press.
- Goodall, Jane. 1990. *Through a Window: My Thirty Years with the Chimpanzees of Gombe*. Boston: Houghton Mifflin.
- Greene, Erick. 1989. "A Diet-Induced Developmental Polymorphism in a Caterpillar." *Science* 243:643-46.
- Hamilton, W. D. 1964. "The Genetical Evolution of Social Behavior I and II." *Journal of Theoretical Biology* 7:1-51.
- Hefner, Philip. 1993a. "Biological Perspectives on Fall and Original Sin." *Zygon: Journal of Religion and Science* 28 (March): 77-101.
- . 1993b. *The Human Factor: Evolution, Culture, and Religion*. Minneapolis: Fortress Press.
- Hobbes, Thomas. [1651] 1988. *Leviathan*. New York: E. P. Dutton.
- Hull, David L. 1976. "Are Species Really Individuals?" *Systematic Zoology* 25:174-91.
- Hunt, Morton. 1990. *The Compassionate Beast: What Science Is Discovering about the Humane Side of Humankind*. New York: William Morrow.
- Jacob, F. 1977. "Evolution and Tinkering." *Science* 196:1161-67.
- Kaye, Howard L. 1986. *The Social Meaning of Modern Biology: From Social Darwinism to Sociobiology*. New Haven: Yale Univ. Press.
- Kitcher, Philip. 1985. *Vaulting Ambition: Sociobiology and the Quest for Human Nature*. Cambridge: MIT Press.
- Kohn, Alfie. 1990. *The Brighter Side of Human Nature: Altruism and Empathy in Everyday Life*. New York: Basic Books.
- Konner, Melvin. 1982. *The Tangled Wing: Biological Constraints on the Human Spirit*. London: Heinemann.
- Maxwell, Mary. 1984. *Human Evolution: A Philosophical Anthropology*. New York: Columbia Univ. Press.
- . 1990. *Morality among Nations: An Evolutionary View*. Albany: State Univ. of New York Press.
- Mayr, Ernst. 1982. *The Growth of Biological Thought*. Cambridge: Harvard Univ. Press.
- McBrien, Richard P. 1994. *Catholicism*. San Francisco: HarperSanFrancisco.

- Midgley, Mary. 1978. *Beast and Man: The Roots of Human Nature*. Ithaca, N.Y.: Cornell Univ. Press.
- . 1981. *Heart and Mind: The Varieties of Moral Experience*. London: Harvester Press.
- . 1994. *The Ethical Primate: Humans, Freedom and Morality*. London: Routledge.
- Morris, Richard. 1983. *Evolution and Human Nature*. New York: Avon Books.
- Moses, Phyllis B., and Nam-Hai Chua. 1988. "Light Switches for Plant Genes." *Scientific American* 258:88–93.
- Murphy, Jeffrey G. 1982. *Evolution, Morality, and the Meaning of Life*. Totowa, N.J.: Rowman and Littlefield.
- Oates, David. 1988. "Social Darwinism and Natural Theodicy." *Zygon: Journal of Religion and Science* 23 (December): 439–54.
- Oliner, Samuel P., and Pearl M. Oliner. 1988. *The Altruistic Personality: Rescuers of Jews in Nazi Europe*. New York: Free Press.
- Pagels, Elaine. 1989. *Adam, Eve, and the Serpent*. New York: Vintage Books.
- Pelikan, Jaroslav. 1971. *The Christian Tradition: A History of the Development of Doctrine*. Vol. 1: *The Emergence of the Catholic Tradition 100–600*. Chicago: Univ. of Chicago Press.
- Pius XII. [1950] 1956. "Humani Genensis." Translated by Ronald A. Knox. In *The Papal Encyclicals in Their Historical Context*, ed. Anne Fremantle, 283–87. New York: New American Library.
- Pugh, George E. 1977. *The Biological Origin of Human Values*. New York: Basic Books.
- Rachels, James. 1986. *The Elements of Moral Philosophy*. New York: Random House.
- Richards, Robert J. 1986. "A Defense of Evolutionary Ethics." *Biology and Philosophy* 1:265–93.
- Ricklefs, Robert E. 1973. *Ecology*. Newton, Mass.: Chiron Press.
- Rigby, Paul. 1987. *Original Sin in Augustine's Confessions*. Ottawa: Univ. of Ottawa Press.
- Ruse, Michael. 1977. "Sociobiology: Sound Science or Muddled Metaphysics." In *PSA*, ed. F. Suppe and P. D. Asquith, 48–76. East Lansing, Mich.: Philosophy of Science Association.
- . 1981. "Species as Individuals: Logical, Biological, and Philosophical Problems." *Behavioral and Brain Sciences* 4:299–300.
- . 1986. *Taking Darwin Seriously*. London: Basil Blackwell.
- . 1988. "Response to Williams: Selfishness Is Not Enough." *Zygon: Journal of Religion and Science* 23 (December): 413–16.
- . 1994. "Evolutionary Theory and Christian Ethics: Are They in Harmony?" *Zygon: Journal of Religion and Science* 29 (March): 5–24.
- Ruse, Michael, and E. O. Wilson. 1986. "Moral Philosophy as Applied Science." *Philosophy* 236:173–92.
- Schwartz, Bernard. 1986. *The Battle for Human Nature: Science, Morality, and Modern Life*. New York: W. W. Norton.
- Singer, Peter. 1981. *The Expanding Circle: Ethics and Sociobiology*. New York: Farrar, Straus, and Giroux.
- Sober, Elliott. 1994. "Did Evolution Make Us Psychological Egoists?" In *From a Biological Point of View: Essays in Evolutionary Philosophy*, ed. Elliott Sober, 8–27. Cambridge: Cambridge Univ. Press.
- Stump, Eleonore. 1989. "Atonement and Justification." In *Trinity, Incarnation, and Atonement: Philosophical and Theological Essays*, ed. Ronald J. Feenstra and Cornelius Plantinga Jr., 178–209. Notre Dame, Ind.: Univ. of Notre Dame Press.
- Tennant, Frederick R. [1903] 1968. *The Sources of the Doctrines of the Fall and Original Sin*. New York: Schocken Books.
- Trivers, Robert L. 1971. "The Evolution of Reciprocal Altruism." *Quarterly Review of Biology* 46:35–57.
- . 1972. "Parental Investment and Sexual Selection." In *Sexual Selection and the Descent of Man 1871–1971*, ed. Bernard Campbell, 136–79. Chicago: Aldine Publishing.
- . 1974. "Parent-Offspring Conflict." *American Zoologist* 14:249–64.
- Urban, Linwood. 1986. *A Short History of Christian Thought*. New York: Oxford Univ. Press.
- van den Bergh, Pierre L. 1981. *The Ethnic Phenomenon*. New York: Elsevier.

- Vandervelde, George. 1981. *Original Sin: Two Major Trends in Contemporary Roman Catholic Reinterpretation*. Washington, D.C.: University Press of America.
- Ware, Timothy. 1993. *The Orthodox Church*. London: Penguin Books.
- Williams, George C. 1966. *Adaptation and Natural Selection*. Princeton, N.J.: Princeton Univ. Press.
- . 1988. "Huxley's Evolution and Ethics in Sociobiological Perspective." *Zygon: Journal of Religion and Science* 23 (December): 383–407.
- . 1994. "Ruminations on Ruse and Religion." *Zygon: Journal of Religion and Science* 29 (March): 37–44.
- Williams, Patricia A. 1988. "Kin Selection, Symbolization, and Culture." *Perspectives in Biology and Medicine* 31:558–66.
- Wilson, E. O. 1975. *Sociobiology: The New Synthesis*. Cambridge: Harvard Univ. Press, Belknap Press.
- . 1978. *On Human Nature*. Cambridge: Harvard Univ. Press.
- Wyschogrod, Michael. 1986. "Sin and Atonement in Judaism." In *The Human Condition in the Jewish and Christian Traditions*, ed. Frederick E. Greenspahn, 103–28. Hoboken, N.J.: KTAV Publishing.