THE TRUTH, GOODNESS, AND BEAUTY OF DARWINISM

by Larry Arnhart

Abstract. As a young proponent of "creation science," I rejected Darwinian biology as false, bad, and ugly. Now I defend Darwinism as true, good, and beautiful. Moreover, I now see Darwinism as compatible with the natural piety that arises as one moves from nature to nature's God.

Keywords: creationism; Darwinism; intelligent design; morality; natural law; natural religion.

As a high school student in West Texas in the 1960s, my mind and heart were shaped by the fundamentalist Baptist churches I attended and by the conservative political movement associated with Barry Goldwater and Ronald Reagan. I began every day reading a few chapters from the Bible according to a rigorous schedule so that I would read the Bible through from beginning to end once a year. I took the account of creation in the book of Genesis as a literal history of the beginnings of the world. Consequently, I regarded Charles Darwin's theory of evolution by natural selection as a denial of the biblical creation story. From reading Henry Morris and other leaders in the creation science movement, I learned all the arguments for why the Bible was more accurate in explaining the origins of things. For me opposing Darwinism was part of my devotion to Goldwater conservatism, because the conservative case for human freedom seemed to

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me to assume a moral and religious view of human dignity that was denied by Darwinian materialism.

When I went to my first high school biology class at Big Spring High School in Big Spring, Texas, I came to class prepared to debate the teacher and prove that Darwinian biology was both false and dangerous—false because it was not supported by the factual evidence and dangerous because it promoted a materialistic view of the world that subverted God's moral law. I was surprised when neither the teacher nor the textbook in the class made any reference to evolution or Darwin. I discovered that the very people I admired for their opposition to Darwinism had succeeded in Texas in removing any study of Darwinism from the public schools. I was deeply disappointed. I urged the teacher to say something about Darwinian evolution. I argued that surely the public schools were obligated to promote intellectual debate about science. I was frustrated that I had been deprived of my chance to win the glory that would have come from destroying Darwinism before my classmates.

Because of that experience of my youth, I understand and respect those who oppose Darwinian biology for moral or religious reasons. But now I defend Darwin and Darwinism. When I was in high school, I thought Darwinian biology was false, bad, and ugly. It was false because the scientific evidence and biblical revelation were against it. It was bad because it promoted a hedonistic view of the human condition that was morally corrupting. It was ugly because it promoted a materialistic and reductionistic view of the universe that was flat and uninspiring.

But now I see Darwinian biology as true, good, and beautiful. It is true because the weight of the relevant evidence and arguments favors it. It is good because it supports a biological understanding of the natural moral sense. It is beautiful because it evokes wonder before the intricate order of living forms as emergent products of an evolutionary drama.

The issues at stake here are deep. For example, consider the remarks of historian Carl Becker in his classic book, *The Declaration of Independence* (1942). At the end of his book, Becker concluded that Thomas Jefferson's appeal to "the laws of Nature and of Nature's God" must be considered a "faith" that "could not survive the harsh realities of the modern world," because it had been refuted by Darwinian biology. After all, Darwin had shown "that all things human might be fully accounted for without recourse to God or the Transcendent Idea," and "man was only the most highly organized of the creatures," so that human history must be seen, Becker suggested, as "only a more subtly negotiated struggle for existence and survival." "Industrial exploitation, Machiavellian politics, war—what were these, what had they ever been, but Nature's instruments for enabling those to survive who had the power?" (Becker 1942, xviii–xix).

Becker's remarks were first published in 1922, only three years before the famous trial of John Scopes, the public school teacher in Tennessee

who was charged with teaching Darwinian evolution in violation of a state law. Becker's remarks illustrate the sort of moral nihilism associated with Darwinism that provoked the opposition of people like William Jennings Bryan, who spoke for the prosecution at the Scopes trial (Larson 1997, 39–59).

Becker changed his view, however, in a second edition of his book, published in 1942. In his Introduction he declared that "the incredible cynicism and brutality of Adolf Hitler's ambitions" had forced all men to reconsider the ideas of the Declaration of Independence. Phrases such as "the inalienable rights of men" had come to "denote realities—the fundamental realities that men will always fight for rather than surrender" (Becker 1942, 274–79).

And yet, if Becker was right in his original view of Darwinism, it would seem that to believe in the "rights of men" as rooted in nature is contrary to the reductive materialism of Darwinian science. In my youth, I would have agreed with Becker. But now I believe Becker was wrong: Darwinian biology does not refute appeals to natural standards of right and wrong, because a Darwinian account of human nature actually provides scientific support for ethical naturalism, for a moral sense rooted in human nature, for what I now call "Darwinian natural right" (Arnhart 1998; 2000; 2001).

Darwinian Truth

But before considering the moral implications of Darwinism, let us consider its claim to truth. In arguing for the truth of Darwinism, I do not assert that Darwinian theory can be demonstrated conclusively with the precision and certainty that would leave no room for reasonable doubt. Rather, I assert only that Darwin's theory is supported by the preponderance of the evidence and arguments. In fact, that is all that Darwin himself ever claimed for his position.

Darwin's basic argument for his theory moves through three propositions. First, there is great variation in the traits of living organisms. Second, much of that variation is transmitted by inheritance from parents to offspring. Third, those inherited variations that enhance survival and reproduction will tend to be preserved, while those that impede survival and reproduction will tend to be eliminated, and through this process of natural selection new species will arise by descent from ancestral species. Although Darwin did not think natural selection was the only mechanism of evolutionary change, he thought it was the primary mechanism for shaping the adaptive design of organisms.

One of the most serious objections to his theory acknowledged by Darwin was the absence of a geological record that would show the sort of finely graduated transitional forms that must exist to confirm his theory. He thought this could be explained by the imperfections in the geological

record arising from the fact that many organic forms would not leave a fossil record (Darwin 1859, 279–311).

Another objection was that organs of extreme perfection such as the eye could not have been designed from simpler forms by natural selection. Darwin conceded, "If it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down." But, he insisted, "I can find out no such case" (1859, 189). He suggested, for example, that there are numerous gradations of vision beginning with organisms that can only detect light, and such variation would be sufficient for natural selection in forming visual systems of increasing perfection (1859, 186–88).

Darwin conceded that there were many problems that he could not resolve. For example, he could not explain the ultimate origin of life from inorganic matter. Yet even if this remained one of those fundamental mysteries beyond scientific explanation, he saw no reason why this and other limitations on human knowledge should be fatal to his theory (Darwin [1872] 1936, 367).

The continuing legal and political debate in the United States over the teaching of Darwinism in the public schools has drawn attention to the critics of Darwin's theory, particularly those who argue that the biblical account of creation is as good as or even better than Darwinism in explaining the origin of species. In recent decades, there have been at least three positions among these Creationist critics of Darwinism. Those like Henry Morris defend the Genesis story of creation in six days as a literal account of the beginning of the universe less than ten thousand years ago (Whitcomb and Morris 1961; Morris 1985). Those like Phillip Johnson accept the Darwinian claim that the earth is billions of years old, but they argue that there is no clear evidence for the emergence of new species from ancestral species by natural selection (Johnson 1991; 1995). Those like Michael Behe accept the old age of the earth, and they even accept the Darwinian claim that all organisms evolved from a common ancestor, but they deny that Darwin's theory can explain "irreducibly complex" mechanisms at the level of molecular life that manifest the work of an "intelligent designer" (Behe 1996). Johnson and Behe have become allies in defending intelligent design theory. Another member of their intellectual movement is William Dembski, who has used mathematical probability theory to develop criteria for detecting intelligent design as manifested in "specified complexity": we infer intelligent design in events that are highly improbable and that also correspond to some specified pattern (Dembski 1998; 1999).

Henry Morris's assertion of a young earth is implausible in denying the geological evidence for the earth's being much older than ten thousand years. The discovery of radioactivity at the end of the nineteenth century created a way to test the Darwinian theory of the old age of the earth,

because knowing the rate at which radioactive isotopes decay allows us to estimate the age of the rock in which the isotopes are found. A variety of methods using different radiogenic minerals converge on the conclusion that the oldest rocks on the earth are roughly 4.5 billion years old (Miller 1999, 63–80). This evidence is so clear that even Morris admits that these measurements are probably valid, which would seem to refute his young-earth theory. But then he argues that since God is omnipotent, he could have created the world ten thousand years ago to have an "apparent age" of billions of years, just as he created Adam to begin life as a mature adult. Consequently, he says, "the 'true age' of the earth can only be known by means of divine revelation" (Whitcomb and Morris 1961, 343-46). This sophistical argument would require that we believe that God deliberately created the world in such a way that we would be tricked into believing it was older than it really was.

Philip Johnson has tried to escape from such absurdity by finding a way to criticize Darwinism without asserting a literal reading of the Genesis creation story. As Darwin recognized, evolutionary biology has all of the difficulties that come from being a historical science concerned with unique events in the past that cannot be directly observed or experimentally replicated in the present. The record of the past—such as the geological record of fossils—is incomplete, and therefore Darwin's theory of evolutionary history cannot be proven conclusively. Johnson exploits this limitation inherent in any historical science by demanding complete historical and experimental evidence for Darwin's theory. He can then conclude that the theory is unsupported by the evidence whenever the evidence is incomplete, as it always will be. But this rhetorical move seems unreasonable to me in denigrating the impressive evidence for Darwin's theory.

One example of Johnson's rhetorical strategy for dismissing evidence for evolution is how he handles the studies of "Darwin's finches" in the Galapagos Islands. The thirteen species of finches unique to the Galapagos show a pattern of similarities and differences that suggest they evolved from an ancestral species that flew to the islands from the South American continent one-half to one million years ago (Lack 1947; Grant 1986). One of the primary traits distinguishing the various species is the size and shape of the beak, with different beaks adapted for different kinds of food and environmental demands, so that it seems that species have been shaped by natural selection for the diverse ecological niches of the islands. Direct observations by Peter and Rosemary Grant over many years have shown variations in beak size and shape in response to environmental fluctuations such as droughts that favor some kinds of beaks over others. The Grants extrapolated from the observed effects of natural selection on beak size and shape within a species to explain the diversification of species over a half million or more years from a common ancestor.

This forces Johnson to concede that "in some cases, convincing circumstantial evidence exists of evolution that has produced new species in nature" (Johnson 1991, 19). But Johnson generally does not want to concede even this much to the Darwinians. He claims that extrapolating from evolutionary change within a species of finch to explain the gradual evolution of one finch species from another is mere speculation. Like most of the Creationist critics of Darwinism, Johnson argues that the evidence for microevolution (evolutionary change within species) does not support macroevolution (evolutionary emergence of new species from ancestral species). But in dismissing such extrapolation, Johnson sets up a standard of evidence that is unreasonable given the impossibility of directly observing evolutionary changes over hundreds of thousands or even millions of years (Johnson 1991, 25–28).

As Robert Pennock has argued, we can compare the biological evolution of species and the cultural evolution of languages. Just as we can infer that modern languages have evolved from ancient languages through the accumulation of gradual changes over time, even though we cannot directly observe one language changing into another, so we can infer that modern species of life have evolved from ancestral species through the accumulation of gradual changes over time, even though we cannot directly observe one species changing into another. And just as there is no absolute distinction between different dialects of the same language and different languages, so there is no absolute distinction between different varieties of the same species and different species (Pennock 1999, 117–79).

Johnson further confuses the debate by saying, "I believe that a God exists who could create out of nothing if he wanted to do so, but who might have chosen to work through a natural evolutionary process instead" (Johnson 1991, 14). In another passage, he says that "God could work through evolution, or natural selection, and in limited respects he does" (Johnson 1997, 88). Does this suggest that God might have chosen to allow the finches in the Galapagos to diversify into thirteen species from an ancestral species through a history of natural selection? If so, then it would seem that Creationism is fully compatible with Darwinian theory, and there really is no debate. But this contradicts Johnson's general argument against Darwinism.

If Johnson's point were that evolutionary theory cannot be proven beyond a reasonable doubt because of the limitations on evidence for a historical science, I would agree. But it does not follow from this that we should therefore refuse to consider the available evidence as favoring the probable truth of Darwin's theory.

In fact, even an apparent ally of Johnson's, Michael Behe, judges that there is enough evidence to support the Darwinian conclusion that all species, including human beings, arose from a common ancestor by descent with modification by natural selection (Behe 1996, 5, 175–76, 227–28,

231, 242). Even so, Behe maintains that one kind of biological system cannot be explained by Darwin's theory—namely, any system that is "irreducibly complex." By this he means "a single system composed of several well-matched, interacting parts that contribute to the basic function, wherein the removal of any one of the parts causes the system to effectively cease functioning." Such a system "cannot be produced directly (that is, by continuously improving the initial function, which continues to work by the same mechanism) by slight, successive modifications of a precursor system, because any precursor to an irreducibly complex system that is missing a part is by definition nonfunctional" (Behe 1996, 39). To illustrate this, Behe uses his favorite analogy, a mousetrap, which is irreducibly complex because it could not perform its function of catching mice if any one of its interlocking parts were absent.

If Darwinian gradualism cannot explain irreducibly complex systems, and if the alternative explanations that rely on "unintelligent causes" are insufficient, then, Behe concludes, we must infer that such complex systems are products of intelligent design, in which design means "the purposeful arrangement of parts" (Behe 1996, 193). The primary evidence for Behe's position comes from his description of six kinds of biomolecular mechanisms—bacteria moved by a flagellum, cells moved by cilia, blood clotting, cellular transport systems, the immune system, and the biosynthesis of proteins and nucleic acids. In each case, he shows first the great complexity of these systems, and then he claims that no scientist has so far succeeded in explaining clearly and precisely how these complex biochemical systems emerged gradually by Darwinian evolution. According to Behe, scientists should conclude from this that the only way to explain such biological complexity is to infer intelligent design.

There are many possible criticisms of Behe's argument. I will consider three. The first, and perhaps most fundamental, is that Behe's argument from ignorance is fallacious. Our inability to explain the evolutionary pathways for the biochemical mechanisms that Behe uses as examples does not prove that such pathways do not exist. After all, the history of science is the history of finding good explanations for what previously was unexplained, and so future advances in knowledge might eventually explain the evolutionary origins of the biochemical systems that now seem beyond such explanation.

Behe's argument from ignorance—like any such argument—is both strong and weak. It is strong to the extent that Behe can convince us that no scientist has so far presented a persuasive explanation of molecular evolution by Darwinian processes. And yet his argument is weak to the extent that developing such an explanation in the future remains a realistic possibility.

My second criticism of Behe's argument is that it is sophistically constructed so that it could never be falsified. Even if we explain the evolutionary origin of some biochemical mechanism, Behe can always say that

whatever remains unexplained is the evidence for intelligent design. To refute his appeal to supernatural causes we must explain everything by natural causes. But because science will never succeed in explaining everything, he can never be refuted.

Behe often accepts the Darwinian explanations for the origin of anatomical structures. And even at the level of molecular biology, he sometimes concedes that Darwinian theory is adequate. For example, he accepts the Darwinian explanation for the origin of hemoglobin—the protein that carries oxygen in the blood—as having evolved through a natural modification of the simpler protein myoglobin. Here, he admits, "the case for design is weak" (Behe 1996, 207). Yet as long as there are other biological systems that are not yet explained so clearly by natural causes, Behe can infer intelligent design.

My third criticism of Behe's position is that to save his argument for intelligent design he must portray his intelligent designer as a cosmic jokester. A common Darwinian objection to any argument for intelligent design is the argument from imperfection. If life was created by an intelligent designer with omnipotent power, why are there so many apparent imperfections in the living world? For example, the eye seems in many respects to be perfectly designed for vision, but actually, as Darwin indicated, even seemingly perfect organs like the eye show imperfection in their design (Darwin 1859, 201–2). The location of the blood vessels and nerves in front of the retina blocks the incoming light, and this also makes it necessary for the optic nerve to poke through the wall of the retina on the way to the brain, which creates a blind spot. Darwin would explain this design flaw as a consequence of the contingencies of evolutionary history in which natural selection had to tinker with whatever was available for adaptation to visual function. But if the eye was specially designed by an omnipotent and intelligent designer, one would expect a better job. The imperfections in nature's design seem to be evidence that nature is not completely the product of an intelligent designer.

Behe rejects such reasoning, however; he says this falsely assumes that we can know the motives of an intelligent designer. "The inference to design can be held with all the firmness that is possible in this world," he insists, "without knowing anything about the designer" (Behe 1996, 197). The irreducible complexity of the biological mechanisms in the visual system can be explained only by inferring an intelligent designer. This inference is valid even if we know nothing about the motives of the designer. We cannot rule out the possibility that the designer wanted eyes to have blind spots to serve some purpose that is not apparent to us. "Features that strike us as odd in a design," Behe suggests, "might have been placed there by the designer for a reason—for artistic reasons, for variety, to show off, for some as-yet-undetected practical purpose, or for some unguessable reason—or they might not. Odd they may be, but they may still be designed

by an intelligence" (1996, 223–24). It is hard to take seriously such an assertion that what look like the sort of imperfections that one would expect to result from evolutionary history are actually displays of a cosmic jokester who wants to show off.

I would emphasize, however, that Darwinian explanations of life as governed fully by natural laws do not deny the existence of God as the creator of those laws. Although Darwinian science assumes the regularity of nature as governed by causal laws, we can infer that those laws were originally created by God. Thus, Darwinism is compatible with belief in the biblical God. Indeed, there is a long tradition of theistic evolutionism, from Asa Gray to Howard Van Till (Livingston 1987; Van Till 1986).

As Kenneth Miller indicates, the Creationist critics of Darwinism actually show a remarkable lack of faith in God's omnipotence, because they generally assume that God lacks the power to create a world in which life could evolve by natural laws (Miller 1999, 217–18, 267–69, 288–89). Occasionally, as I have indicated, creationists like Johnson will suggest that an omnipotent God could have used Darwinian natural laws to create everything, but they cannot say this without giving up the debate.

Although the Creationist criticisms of Darwinism are ultimately implausible, I believe that allowing our public school students to study and debate those criticisms in their biology classes would promote a better understanding of scientific argumentation. If students were to study some Creationist texts along with Darwin's writings and some contemporary texts defending Darwin, they could judge the arguments and evidence for themselves. Science education in the public schools often consists of mindless memorization of scientific formulas so that students have no understanding of how one goes about weighing the evidence and arguments for and against scientific ideas. A lively classroom debate over Darwinism would be a great improvement, and it might actually prepare students to become citizens capable of judging scientific controversies that have legal and political consequences.

It would be good for high school students to see how a scientific debate can become an exercise in rhetorical persuasion. They might notice that the rhetorical situation in the debate between intelligent design theory and Darwinism is such that those who take the negative side tend to look stronger than those who take the affirmative. The proponents of intelligent design look good when they are challenging the Darwinians to show empirical evidence for the step-by-step evolutionary pathway of complex biological mechanisms. The Darwinians look good when they are challenging the intelligent design theorists to explain exactly where and how the intelligent designer intervened in the natural order. As with any historical science that requires reconstructing the past from fragmentary evidence, Darwinian theory depends heavily on theoretical models based on speculative scenarios. The critics of Darwinism can exploit this weakness,

even as they try to hide the weakness in their own position by refusing to specify the miraculous workings of the intelligent designer.

Darwinian Goodness

Part of any classroom debate in the public schools should be a consideration of the moral implications of Darwinism. Most of the opposition to Darwinian theory is motivated not by a purely intellectual concern for the truth or falsity of the theory but by a deep fear that Darwinism denies the foundations of traditional morality. This is evident in Johnson's warning that Darwinism promotes moral relativism and nihilism by denying the traditional notion of natural moral law (Johnson 1995, 138–53). That fear is mistaken, however, because Darwinism shows how morality is rooted in human nature and thus confirms the idea of natural law.

From the very beginning of Darwin's thoughts about evolution by natural selection—as recorded in his notebooks from the late 1830s—he wanted to explain the biological basis for morality. In exploring this topic, he studied the history of moral philosophy. But it was not until 1871, in *The Descent of Man*, that he published his biological theory of morality as rooted in a natural moral sense (Darwin 1871, 1:70–106, 2:390–96; 1987, 619–29). Darwin thus revived a tradition of ethical naturalism that goes back to Aristotle and Thomas Aquinas.

"Of all the differences between man and the lower animals," Darwin declared, "the moral sense or conscience is by far the most important" (1871, 1:70). Morality in the strict sense, it seems, is uniquely human. How do we explain this? Darwin formulates his biological theory of morality in a single proposition: "any animal whatever, endowed with well marked social instincts, would inevitably acquire a moral sense or conscience, as soon as its intellectual powers had become as well developed, or nearly as well developed, as in man" (1871, 1:71–72). Human beings are moral animals because they have the cognitive capacity to compare their desires or passions and judge that some are more important or enduring than others. As social animals, they feel concern for the good of others, and they feel regret when they allow their selfish passions to impede the satisfaction of their social passions. The word *ought*, Darwin concludes, signifies the consciousness that since some passions are more persistent and central to one's life than others, one cannot be fully happy if one does not satisfy those stronger passions.

Darwin sees morality as having emerged through four overlapping stages (1871, 1:72–73). First, *social instincts* would have led human ancestors to feel sympathy for others in their group, which would promote a tendency to mutual aid. Second, the development of the *intellectual faculties* would allow early human ancestors to perceive the conflicts between instinctive desires, so that they could feel dissatisfaction at having yielded to a momentarily strong desire (like fleeing from injury) in violation of some more

enduring social instinct (like defending one's group). Third, the acquisition of *language* would permit the expression of social opinions about good and bad, just and unjust, so that primitive human beings would respond to praise and blame in satisfying their social instincts. Finally, the capacity for *habit* would allow individual conduct to conform to social opinions through acquired dispositions. As a result, Darwin concludes, "a highly complex sentiment, having its first origin in the social instincts, largely guided by the approbation of our fellow-men, ruled by reason, self-interest, and in later times by deep religious feelings, confirmed by instruction and habit, all combined, constitute our moral sense or conscience." This moral sense could eventually express itself in fundamental principles such as the Golden Rule—"to do unto others as ye would they should do unto you" (1871, 1:165–66).

To illustrate how human morality arises from practical reasoning about social instincts, Darwin often speaks of sexual mating and parental care. All social attachment is probably an extension of the parental and filial affections, which were shaped by natural selection to secure care for offspring who could not have survived without such care. Sometimes the desire of parents to care for their young will conflict with other desires that are momentarily stronger, but the human capacity to deliberately compare alternative scenarios of action allows human parents to see that caring for their children must generally be one of the central features of a whole life well lived. The moral and legal institution of marriage arises from human deliberation as a formal custom to sanction the sexual, parental, and economic union of husband and wife to serve their natural desires for mating and parenting.

Similarly, Aristotle concluded from his biological studies of animal behavior that all social cooperation arises ultimately as an extension of the natural impulses to sexual coupling and parental care of the young. Some animals provide little care for their offspring. But the more social and more intelligent animals care for the complete development of their young. Aristotle observed that human beings and the other political animals are characterized by the great duration and intensity of parental care, which includes not only feeding and protecting the young but also passing on the habits and knowledge required for living in groups with complex social structures (*History of Animals* 588b23–89a9; *Generation of Animals* 753a8–14; *Nicomachean Ethics* 1155a1–33, 1159a27–37, 1160b23–62a29).

Thomas Aquinas continued Aristotle's biological reasoning about ethics in defending his idea of natural law or natural right. Natural right, Aquinas declared, "is that which nature has taught all animals." Sexual mating and parental care belong to natural law because they are natural inclinations that human beings share with some other animals. And although the rationality of human beings sets them apart from other animals, human reason apprehends natural inclinations such as mating and parenting as good (*Summa*

Theologica I–II, q. 94, a. 2). Aquinas speaks of the human disposition to marriage as a "natural instinct of the human species" (*Summa Contra Gentiles* bk. 3, chap. 123).

Adam Smith continued in this same tradition of ethical naturalism in his book, *The Theory of Moral Sentiments*. Smith showed how ethics could be rooted in the moral sentiments of human nature and the natural inclination to sympathy. Like Aristotle and Aquinas, Smith argued that marriage is natural because it is rooted in natural instincts or inclinations shared with other animals (Smith [1790] 1976, 219–27; 1978, 141–43).

But while Smith spoke repeatedly of nature as instilling those moral sentiments that would promote the survival and propagation of human beings as social animals, he could not explain exactly how it was that nature could shape the human animal in this way ([1790] 1976, 77–78, 87, 142, 219). Such an explanation was later provided by Darwin, who showed how these natural dispositions could have been shaped by natural selection in human evolutionary history. Thus, Darwin provided a modern biological account of human nature that could support the tradition of ethical naturalism that began with Aristotle.

Recently, Edward O. Wilson has sought to revive this Darwinian view of ethical naturalism. Since morality is ultimately rooted in the moral sentiments of human nature, Wilson argues, a natural science of morality would require a biology of the moral sentiments. In pursuing this project, he sees himself as continuing a tradition of ethical reasoning that began with Aristotle and continued with Smith and Darwin (Wilson 1998, 238–56).

Likewise, I have argued for a Darwinian version of ethical naturalism that I call Darwinian natural right (Arnhart 1998; 2001). The good is the desirable, I claim, because all animals capable of voluntary movement pursue the satisfaction of their desires as guided by their information about the world. Only human beings, however, can pursue happiness as a deliberate conception of the harmonious satisfaction of our desires over a whole life, because only we have the cognitive capacities for reason and language that allow us to formulate a plan of life, so that we can judge present actions in the light of past experience and future expectations.

If the good is the desirable, then human ethics is natural insofar as it satisfies natural human desires. I have argued that there are at least twenty natural desires that are manifested in diverse ways in all human societies throughout history (Arnhart 1998, 29–36). Those twenty natural desires include sexual mating and parental care. Darwinian biology shows how these desires could have been shaped by natural selection as part of human nature.

Like the Hobbesian utilitarians, I recognize the natural selfishness of human beings, but I also recognize their natural sociality. Like the Kantian transcendentalists, I recognize the role of reason in formulating moral rules, but I also recognize that the motivational foundation of ethics is not the

logic of pure reason but the satisfaction of natural desires. Like the Burkean relativists, I recognize the importance of cultural traditions in shaping moral development, but I also recognize that the universality of the natural human desires allows us to criticize and reform cultural traditions that frustrate those natural desires.

The importance of the natural moral sense rooted in human biology becomes clear when we consider those few human beings who apparently have no moral sense. In explaining how the moral sense depends on the social instincts, Darwin speaks of those who lack social emotions—who are not moved by love and sympathy—as "unnatural monsters," who might become the "worst criminals" because they are "entirely destitute of conscience" (Darwin 1871, 1:89–92). Aristotle and Aquinas thought such depravity could arise from three possible causes—from injury, from habituation, or from innate temperament (Aristotle, *Nicomachean Ethics* 1148b15–49a20; Aquinas, *Commentary on Aristotle's "Nicomachean Ethics"* secs. 1368–75). A physical injury could cause mental disorder. Bad habituation, as in those abused from childhood, could cause morbid behavior. Or an inborn abnormality of temperament could cause a brutal disposition.

In the terminology of modern psychology, those who have no moral sense are psychopaths. They are people like Ted Bundy, who brutally murdered at least thirty-six young women and perhaps over a hundred before he was executed in Florida in 1989. Psychopaths are ruthless social predators who, with no feeling of guilt or regret, charm, manipulate, deceive, attack, and sometimes kill other human beings. Harming others, even friends and family members, does not bother them, because they are incapable of feeling the pain of others. Egoistic, deceitful, greedy, and impulsive, they are utterly asocial creatures who restlessly crave whatever capricious pleasures excite them at any moment without regard to social norms.

I have argued that psychopaths suffer from an abnormal poverty of desire: they lack the social desires that support the moral sense in normal people (Arnhart 1998, 211–30). Without that moral sense, psychopaths must be treated by the rest of us as moral strangers whose dangerous conduct can be restrained only by force. Far from denying the reality of the natural moral sense, the existence of psychopaths shows that the normal pattern of natural desires is the ultimate ground for morality, and therefore moral persuasion is impossible with those few human beings who lack the natural desires typical of all other human beings.

Modern explanations of the causes of psychopathy fall into the three categories suggested by Aristotle. Injuries to certain parts of the brain can induce previously normal people to display some of the traits of psychopathy. Some psychopaths have been hurt by the unhealthy circumstances of their childhood, which have habituated them to act with a cynical and cold indifference to the feelings of others. But many if not most psychopaths express an inborn temperament to not feel social emotions, and this seems

to arise from some abnormal functioning of the frontal lobes of the brain.

Philosophers like Immanuel Kant sometimes argue that morality requires a purely rational logic of universal rules free from any emotions or desires. Psychopaths show that this cannot be true. There is no evidence that psychopaths have any deficit in their capacity for abstract rationality or pure logic. Their immorality comes not from any defect of abstract reason but from their emotional poverty. They cannot be moral, because they lack the social emotions—such as sympathy, guilt, and shame—that sustain moral conduct.

From a Darwinian view of morality, we can see that a moral sense is natural, because no society of psychopaths could survive, and therefore natural selection would tend to favor dispositions for acquiring a moral sense. But as is usually the case in biology, *natural* here denotes not a necessity that arises in every case but a propensity that arises in most cases: as a result of human evolutionary history, human beings generally have a natural propensity to learn the social norms required for living as social animals, but a few—because of abnormalities of birth or environment—will not show that propensity for moral learning.

Believing that this view of morality as rooted in a natural moral sense is supported by Darwinian biology, I reject Becker's assumption that Darwinism must deny that there are any natural standards of right and wrong. When Thomas Jefferson spoke of the "inalienable rights of man" and when we today speak of "universal human rights," there is an implicit appeal to a universal human nature manifested as natural desires that are expressed throughout history in all human societies. For example, the Universal Declaration of Human Rights of 1948 justifies "the right to marry and to found a family" by declaring that "the family is the natural and fundamental group unit of society" (Brownlie 1981, 24). As we have seen, Darwin would explain the naturalness of the family as an expression of the natural human desires for mating and parenting.

Darwinian biology thus helps us to understand the natural origins of such desires and how they support a natural moral sense. In allowing us to correctly understand that natural moral sense, Darwinism is not only true but also good.

Darwinian Beauty

Not only is Darwinism true and good, it is also beautiful. It uncovers the intellectual beauty of nature by revealing the intricate order of living forms as arising from a grand evolutionary drama directed by natural law. Darwin conveys the beauty of that drama in the final paragraph of *The Origin of Species*.

> It is interesting to contemplate a tangled bank, clothed with many plants of many kinds, with birds singing in the bushes, with various insects flitting about, and

with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around us. . . . From the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being evolved. (Darwin 1859, 490)

Like Darwin, I see "grandeur in this view of life." I also see natural piety, a sense of joyful awe before the lawful order of nature, as evidence for a divine lawgiver. This natural piety is implied in Jefferson's appeal at the beginning of the Declaration of Independence to "the laws of nature and of nature's God," because, as James Madison noted, the most universal and persuasive proof for God's existence will come from reasoning "from the effect to the cause, from nature to nature's God" (Madison 1884, 3:503). Phillip Johnson would scorn such natural piety as "deism," and he warns that it is a mistake "to exchange the Creator God of the Bible for the lifeless First Cause of deism" (Johnson 1997, 16–17). But Johnson himself would seem to appeal to natural religion when he urges Christian theists to "stake their claim on evidence from nature" (1995, 202).

Darwin's natural religion appears not only at the end of *The Origin of Species* but also at the beginning in his epigraph from Francis Bacon, which states the Baconian idea of the "two books" through which God is revealed —general revelation through nature and special revelation through the Bible. This idea was deeply rooted in early modern science and Christian theology (Moore 1986). The epigraph reads:

Let no man out of a weak conceit of sobriety, or an ill-applied moderation, think or maintain, that a man can search too far or be too well studied in the book of God's word, or in the book of God's works; divinity or philosophy; but rather let men endeavour an endless progress or proficience in both. (Bacon, in Darwin 1859, ii)

As a young man, I began each day reading from the "book of God's word." Now, I still read the Bible, though not with the same regularity. And sometimes I begin my day by reading Darwin, which helps me to understand "the book of God's works." Reading Darwin is no substitute for reading the Bible. But as Darwin suggests, both kinds of reading are ultimately expressions of the human desire to understand the wondrous order of nature by reading the mind of God.

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