

Evo Edu Outreach (2010) 3:275–287
DOI 10.1007/s12052-009-0162-z

Darwinian Morality

Catherine Wilson

Published online: 7 August 2009
© Springer Science + Business Media, LLC 2009

Abstract The paper explores the significance of Darwinian evolution for morality and moral theory. After presenting Darwin's own views on the evolution of the moral sense and the Victorian spectrum of opinion on the relevance of natural selection to morals, I argue that a consideration of human evolutionary history can be brought to bear meaningfully on a number of contemporary issues, including the nature of work and family relations. There is no reason, however, to suppose that the fact of human variation and the heritability of traits forces any substantial concession to apologists for social inequality.

Keywords Altruism · Ambivalence · Darwin · Darwinism · Eugenics · Evolutionary ethics · Equality · IQ · Morality

Introduction

According to the terms of Charles Darwin's theory of evolution by natural selection, we human beings are the descendants of ape-like forebears and the remote descendants of one-celled organisms that once floated in a primeval ocean. All that we can understand, imagine, believe, and do is dependent on the anatomy and physiology of our brains, which are products of natural selection as much as our limbs and our other organs. We try to maintain ourselves in existence for as long as possible—to achieve a respectable span of 70 or 80 years—and to produce offspring who will themselves be capable of producing offspring. It is pointless to ask what the purpose of our existence is. Our species is here because a number of singly improbable events

converged to bring our species onto the stage, and there are only the particular purposes that we establish for ourselves. The universe is not in the hands of a powerful and intelligent agent whose benevolence will ensure that everything will turn out for the best.

Many philosophers find these views inspiring, rather than bleak, liberating, rather than dispiriting. The appreciation of our kinship with nonhuman animals and the sense of the unity and coherence of the natural world that Darwinism implies arouse sentiments as respectful as those experienced by religious believers while leaving no doubt that the remediation of social injustice and the restoration and repair of the environment are up to us. Steven Pinker has argued recently that attention to the new human sciences and especially to “evolutionary psychology,” the study of the evolutionary history of attitudes, emotions, and mental capabilities, promises “a naturalness in human relationships, encouraging us to treat people in terms of how they do feel rather than how some theory says they ought to feel” (Pinker 2002, xi).

It would be a mistake in any case to think that Darwinism leads to nihilism—the view that all is permitted but nothing is actually worth doing—or to suppose that the acceptance of Darwinian evolution precipitated a sudden crisis in moral theory. For Darwin's *Origin of Species* of 1859 was not the first book to hint at a natural as opposed to a supernatural origin for human beings. Throughout the late eighteenth century, the evident similarity between apes and humans had attracted attention. German, French, and Scottish philosophy, medicine, and natural history contained a distinctly materialistic and evolutionary strand, and Darwin's own grandfather, Erasmus Darwin, had posited a single common ancestor for all living creatures. Charles Darwin's originality lay in his giving precision to the theory of evolution and extinction by reference to the principle of miniscule variation from generation to generation, with variations that gave the slightest edge in reproduction retained. The quality and

C. Wilson (✉)
School of Divinity, History and Philosophy,
University of Aberdeen,
Aberdeen AB24 3UB, UK
e-mail: c.wilson@abdn.ac.uk

quantity of evidence and the younger Darwin's ability to address objections to the theory of evolution by variation and selection were staggering. Meanwhile, for millennia, moral philosophers had offered accounts of virtue and moral motivation that did not mention a God who lays down ethical commandments or appeal to divine reward and punishment as inducements and sanctions.

Nevertheless, the acceptance of Darwinism has narrowed the options where the foundations of morality are concerned. If the aim of morality is to reduce human suffering and to guide people to act and experience in ways that minimize harms to others, the starting point of moral theorizing ought to be human beings as they exist in nature. The secular tradition in ethics derived from the pagan and atheistical philosophers of the pre-Christian era does not seem adequate, however, to the problems of the mass societies of the industrial and post-industrial era. It is worth asking whether the Darwinian conception of nature can open up any new ways of thinking about the foundations of morality or make any contribution to moral progress in a world that human beings have transformed so thoroughly.

Some years ago, E.O. Wilson declared that the time had come “for ethics to be removed temporarily from the hands of the philosophers and biologized” (Wilson 1975, 562). My purpose in this essay is to begin to explore this recommendation in a hopeful but also critical spirit by considering three interpretations of the term “Darwinian morality.” The term can be taken as referring, first, to Darwin's own account of selection for moral conscience and moral behavior in human beings and their precursors in other animals. Second, it refers to Darwin's conception of moral virtue and moral progress, topics about which he, like many Victorians, thought a good deal. Third, “Darwinian morality” can be understood as the array of moral and political implications that have been drawn from his account of evolution by later theorists. In this third sense, Darwinian morality includes many implications that would not have occurred to Darwin himself or that he would have rejected with indignation as incompatible with his views.

After first presenting some of the most frequently encountered objections to the proposed marriage of biology and morality, I will turn to a survey of Darwin's own writings on morals, following these sections with a discussion of the problems and prospects for a biologically informed ethics. While the first half of this essay is based on material familiar to Darwin scholars, the second part reaches into some areas of moral philosophy that remain ripe for exploration. My central argument is that the biological sciences can contribute to moral progress—not just to the explanation of the origins and formation of moral attitudes and dispositions—but only by working to dispel the myths and superstitions that sustain oppressive social

relations. The existence of measurable physical and psychological differences between individuals and between groups that are the result of random variation on one hand and the selective pressures operating on early humans and their ancestors on the other does not defeat arguments for the moral rightness and practical possibility of greater social equality.

Warnings of the Wary

To many moral philosophers, claims for the relevance and helpfulness of the biological sciences are hollow, false, or dangerous (Farber 1998; Kitcher 1987). There are several reasons for skepticism and caution. First, there is the celebrated argument of David Hume that “ought” cannot be derived from “is,” that no fact about how things are in the world, however well-established, can logically entail that something or other ought or ought not to be done. Of course, to thrive, people need fresh air, clean water, tasty, nutritious food, and elbow room, and most do not have enough of these goods. No one disputes that, if such needs could be met universally without producing some horrific set of side effects, it would be good to do so. However, specialized biological knowledge is not required to identify these basic goods, and to describe them as needed rather than as merely appreciated is to smuggle normativity into the description. Truly neutral biological facts—such as the fact that human men are on average taller and heavier than women—seem to carry no definite implications with them concerning what it is morally correct to do. Our evolutionarily acquired psychological attitudes and dispositions have an evident bearing on how persons, events, and situations are judged, but nothing compels us to say that the resulting judgements are reasonable or correct.

Second, the methodology of much popular evolutionary ethics depends on what might be called “suggestive similitude.” The behavior of ducks, peacocks, and bluebirds is sometimes cited as though it is relevant to human rape, display, or jealous aggression and the behavior of ants as though it is relevant to human slavery or division of labor. But as rape is not the usual mode of animal reproduction and as most animals do not make slaves, such phenomena are relevant only to the extent that the constraints and affordances of human social life can be shown specially to resemble those of ducks, peacocks, bluebirds, and ants.

Finally, there is near universal acknowledgment that the practical application of ethical naturalism in the early to mid-twentieth century was a moral blot on our species. The casual assumption of innate cognitive, moral, and emotional deficiencies in nonwhite humans goes back to David Hume and Thomas Carlyle, but, after Darwin, racism assumed a new, pseudo-scientific form, guided by the

assumption that the “races” of human beings instantiated both earlier, wilder types and later, civilized types, each with the fixed characteristics of its breed. Researchers eagerly sought to demonstrate the hereditary character of idiocy, alcoholism, and criminality. Craniometry, along with other attempts to identify particular facial features and body forms with evolutionary retardation and low intelligence, was regarded as a successful application of scientific methods to the study of human populations, and forced sterilization, genocide, and the exclusion of women and blacks from higher education and the professions were defended as scientifically correct policies in the first half of the twentieth century. Here is a typical observation by the author of several late nineteenth century works on animal instinct and human cognition and the benefactor of the Romanes Lectures on Evolutionary Ethics:

Even so highly developed a type of mind as that of the Negro—submitted, too, as it has been in millions of individual cases to close contact with minds of the most progressive type and enjoying as it has in many thousands of individual cases all the advantages of liberal education—has never, so far as I can ascertain, executed one single stroke of original work in any single department of intellectual activity (Romanes 1893, 13)

Such opinions did not reflect Darwin’s own conflicted but better-grounded and overall more sympathetic views on heredity, intelligence, and education, most of which make an appearance only in his private notebooks. Before going on to consider his views—both published and unpublished—on evolution and social policy, I will give a short sketch of his account of the evolution of the moral sense.

Darwin and the Evolution of the Moral Sentiments

Darwin took a keen interest in moral theory and in aesthetics, and he was well versed in the philosophical literature on these topics. A nineteenth century gentleman scientist could read widely in other disciplines while still making a fundamental contribution to his own, a feat which is scarcely imaginable today. He had little doubt that the human mind, its powers, emotions, and attitudes, had been shaped by natural selection along with the limbs and organs of the human body. He proposed that humans and other animals were endowed with an innate, heritable aesthetic sense that might assist them in selecting particular mates and that accordingly explained the evolution of such display features as elegantly curved horns and brightly colored plumage. His belief in an innate, heritable moral sense, explored in his *Descent of Man* (1871), though less central to his explanatory program, was equally definite. In

two chapters of his *Descent*, he drew on the secular tradition in ethics of Hume and Adam Smith, with its focus on moral psychology and social interaction, using his observations and knowledge of the social life of animals to push back the history of the moral sense into what we now term the Environment of Evolutionary Adaptation, the presumed set of environmental and social conditions—climate, habitat, diet, size, and composition of the social group—that would have been experienced by the earliest anatomically modern humans. These chapters are accordingly the founding document of the field of evolutionary ethics, which today comprises a large popular and semi-popular literature as well as a technical literature on altruism, social interaction, the evolution of language and intelligence, and male and female reproductive strategies.¹

In the course of his researches, Darwin had observed instances of self-sacrifice and devotion throughout the animal kingdom. He rejected the view of some of his contemporaries that every action of a living, sentient creature has a selfish motive, noting that some birds will feed their blind companions. He cited many examples of sentiment and altruism in animals: warning, grooming, hunting, removing thorns, and rescuing, and he did not hesitate to ascribe a rich psychological life to animals. Cows, he observed, though they will expel a wounded animal from the herd or gore or worry it to death, stare intently at a dying companion. A “strong feeling of inward satisfaction,” he thought, must lead a bird, “so full of activity, to brood day after day over her eggs” (Darwin 1871 I:79), and migratory birds must, in the days before they take flight, feel a restless longing. Starfish and spiders, Darwin claimed, somewhat less plausibly, appear to experience some form of parental affection, as do earwigs (Darwin 1882, 106). The difference between human and animal was one of degree, not kind, he thought. Even self-consciousness, he decided, was probably not absolutely peculiar to man.

Declaring that conscience was the most important difference between man and the lower animals, he speculated that “any animal whatever, endowed with well-marked social instincts, the parental and filial affections being here included, would inevitably acquire a moral sense or conscience, as soon as its intellectual powers had become as well, or nearly as well developed, as in man” (Ibid. 98). It was exceedingly improbable, he said, that the impulse to feel sympathy with others, and to try to address their needs—a instinct which, he allowed, did not embrace all members of the species, but only one’s familiars—was acquired by learning. We are influenced, he thought, by the praise and blame of others; but we experience “an

¹ Representative contributions include Hamilton (1964); Trivers (1971, 1972, 1985), Maynard Smith (1982); Skyrms (1996); Sober and Sloan Wilson (1998).

impulsive power widely different from a search after pleasure....” (Ibid. 120)

The difference, in Darwin’s view, between the mind of the lowest man and the highest animal was nevertheless “immense.” Apes could not fashion a stone tool, follow out a train of metaphysical reasoning, solve a mathematical problem, reflect on God, or admire a proposition of natural science, though they could, he thought, make it known that they were impressed by “the beauty of the coloured skin and fur of their partners in marriage” (Ibid. 126). Human imaginings and reminiscences, he thought, had a distinctive frequency and clarity. “Man... cannot avoid reflection: past impressions and images are incessantly and clearly passing through his mind” (Ibid. 112) The relative absence of vivid mental imagery and recall in nonhuman animals was perhaps necessary to their ways of life, he mused, else the migratory bird—for the migratory impulse, he pointed out, is stronger than the maternal—would be consumed with guilt over abandoning her unfledged young and taking wing.

Actions, Darwin went on to say, were originally deemed good or bad as they affected the tribe, and he envisioned a form of group selection. “No tribe could hold together if murder, robbery, treachery, & c. were common... A contented, happy tribe will flourish better than one that is discontented and unhappy....” (Ibid. 117, 121). While he did not consider warfare inevitable and regarded slavery with repugnance, he believed that agonistic interaction between tribes in prehistory had shaped the human character, with the moral virtues of courage, sympathy and faithfulness offering a competitive advantage (Ibid. 129). This suggested to him that natural morality was conducive to the happiness of the social body, though not always the happiness of the individual, and not that of the entire species. He went beyond description and explanation to normativity, maintaining that “it would be advisable... to take as the standard of morality, the general good or welfare of the community, rather than the general happiness”(Ibid. 121). At the same time, Darwin recognized that the judgements of the community could lead to “the strangest customs and superstitions, in complete opposition to the true welfare and happiness of mankind” (Ibid. 122). Celibacy was, in his opinion, just such a custom or superstition, in no way conducive to the general good or welfare of the community. Infanticide, especially of female infants, was a practice he regarded more sympathetically as a means of population control. It was nevertheless an example of what he meant when he noted that his definition of welfare “would perhaps require some limitation on account of political ethics” (Ibid. 121).

Darwin regarded the struggle to exist and to reproduce as largely invisible. The casual observer could not see, in most cases, the traits that determined the size of a future lineage and that would be preserved, because the variations in a

breeding population were so slight. Many relevant advantages—differences in physiological efficiency, for example, or sexual attractiveness—are not open to ocular inspection or appreciated by human onlookers. As conditions change, moreover, an advantage may become a disadvantage, or vice-versa. Some forms of overt competition—fighting rivals for territory or for mates—were evident to naked-eye inspection, but Darwin laid less stress on these forms of competition than he did on invisible processes. Yet reading the words “struggle,” and “survival” in evolutionary writings, many audiences associated them with war, meritocratic contests, and competition in the marketplace, all of which involve overt and deliberate effort to kill, defeat, humiliate, or dismantle the operations of the opponent. From these assumptions, it was a short step to the inference, precisely contrary to what Darwin had posited of animals, that human beings were driven exclusively by ruthless self-interest, moderated in the case of females by maternal dispositions and perhaps by paternal concern in the case of males. War eliminated the inferior races, and starvation culled the physically weak, incompetent and lazy. Care for those disadvantaged by nature was perverse on this view and conducive to the degeneration of the species.² If good and bad character traits were passed down from parent to child, marriage and reproduction could be controlled, not merely to maximize the preservation of wealth or strengthen political alliances as the aristocracy had always tried to do, but on a mass scale, so as to eliminate undesirable traits in the working classes.

The notion that human being should apply the techniques of animal breeders to their own species was as old as Plato, but the suggestion that much of the human population was technically unfit to live was the brainchild of the clergyman Thomas Malthus, whose *Essay on Population* (1798) Darwin began to read, according to his *Autobiography*, “for amusement” in 1838, and which had, he claimed, provoked him to consider natural selection as the explanation of the formation of new species (Darwin 1958, 120). Observing that nature culled her surplus productions through starvation and disease, Malthus recommended sexual abstinence for the poor as the only possible solution to the problem of a limited resource base and low workers’ wages. “A man who is born into a world,” Malthus wrote in the second edition of his *Essay*, “if he cannot get subsistence from his parents on whom he has a just demand and if the society does not want his labour, has no claim of right to the smallest portion of food, and in fact has no business to be where he is. At nature’s mighty feast there is no vacant cover for him....” The infant, Malthus thought, “is, comparatively speaking, of little value to the society, as others will immediately supply

² See Bellomy, D C (1984) for a full treatment of “Social Darwinism.”

its place” (Malthus 1803, 521). While some readers accepted these pronouncements as unpleasant but nevertheless objective truths, there was much protest as well. More than 50 years later, Karl Marx referred to the “bungling interference” of moralizing clergymen, and he and Friedrich Engels ascribed the squalor and dissipation in the lives of factory workers, and the high mortality rates of their children, to the exploitative conditions of their employment.

The claim that competition and conquest rewarded the best and improved the species was contested from Darwin’s day onwards.³ John Stuart Mill wrote a diatribe against taking nature as normative, declaring that nature was the source of “false taste, false philosophy, false morality,” and bad law. Lying, dissembling, cruelty, and what he called the “instinct of domination,” which excited in some persons a kind of voluptuous thrill in holding others to their will, were natural inclinations requiring firm repression (Mill 1904, 29). Thomas Henry Huxley, a convinced Darwinian, was drawn to Buddhist ideals of compassion and detachment. He agreed with Darwin regarding the existence of an evolutionary basis for morality but declared in his *Romanes Lectures* that the struggle to exist at the expense of others was frankly opposed to morality. Ethics demanded the repudiation of what he referred to as the “gladiatorial theory of existence” (Huxley 2004, 33). Alfred Russel Wallace, the co-discoverer of the principle of natural selection, drew similar conclusions. According to James Marchant, the editor of his letters and reminiscences, “The sacrifice...of human life in dangerous employments for the purpose of financial gain, no less than the frightful slaughter of the battlefield, was abhorrent to [him] and aroused his intensest indignation.” Wallace agitated for women’s rights and participation in national service, as well as for communal ownership of land, better housing, higher wages, employment security, abolition of preventable diseases, and “wider education, not merely for the practical work of obtaining a livelihood but to enable [workers] to enjoy art and literature and song” (Marchant 1916, II: 244–245). Wallace rejected eugenics, describing it as “the meddlesome interference of an arrogant scientific priesthood.” He feared that it would “perpetuate class distinctions, and postpone social reform,” and afford quasi-scientific excuses for keeping people “in the positions Nature intended them to occupy” (Ibid. 246).

Darwin’s own views on violence, hereditary strengths and weakness, and the capabilities of the races were characteristically subtle and sometimes conflicted. One aim of the *Descent of Man* was to show that the differences in facial features, body types, and skin color of different human groups that would have been impossible or difficult to explain as environmental adaptations were the product of sexual selection for beauty, which different groups per-

ceived differently. That these features reflected only aesthetic preference indicated to him that they were superficial, bearing no relation to underlying character or competence. He had been impressed on one of his *Beagle* voyages by the ease with which a fully grown Tierra de Fuegian had been educated into European manners in just a few years, and in the first edition of the *Descent*, he commented on the “numerous points of mental similarity between the most distinct races of man” and on “the close similarity between the men of all races in tastes, dispositions, and habits”(Darwin 1882, 178). At the same time, Darwin’s materialism led him to the conclusion that psychological characteristics were just as variable as physical characteristics, insofar as thought was produced by the brain. “The races of men,” he had mused in his *Notebooks*, “differ chiefly in size, colour, form of head, & features (hence intellect?) & what kinds of intellect) quantity & kind of hair forms of legs...” (Darwin 1987, 303).

It is not often realized that Darwin believed in the inheritance of acquired habits. An animal that adopted some new practice could transmit the tendency to do so to its descendants, insofar as the practice would modify the brain and body of the animal, for according to Darwin’s hypothesis, the material of inheritance was drawn from the entire body of the animal (Darwin 1865). He could see that there must be variation in order for evolutionary change to occur, and he was convinced that variation could not be due to chance but must be the effect of a cause, implying some law-like process. One consequence of the theory of hereditary habits was that education might have not only a direct effect on the educatee but actually produce more brilliant descendants. Hence, at one time or another, Darwin appeared to hold that human beings are everywhere basically the same in their mentality no matter how different their appearances, that their mentality differs as much as their external appearance, i.e., to a considerable degree, that the cultural environment induces heritable changes, and that education can rapidly eliminate substantial behavioral differences.

Darwin’s confusion or indecision on these points stands in marked contrast to the unempirical and unreflective dogmatism of many of his contemporaries. In the *Descent*, he expressed himself fatalistically, however, about racial extinction and the elimination of entire species. He believed that, in the not too distant future, the “civilised races of man” would exterminate the “savage races” and the anthropomorphous apes. Among the members of the civilized nations, who were destined to survive, improvement was possible and indeed imperative. “Educate all classes—avoid the contamination of castes, improve the women...,” he ventured in his early *Notebooks* (Darwin 1987, 309).

Darwin’s universalism is evident in his conviction that moral progress consisted in the enlargement of the motive

³ See Crook (1994), 153ff.

of sympathy and the extension of the helping hand. He believed that the development of the moral sense from its earliest human form implied the adoption of broadly welfarist criteria of moral right.

[A]s man gradually advanced in intellectual power, and was enabled to trace the more remote consequences of his actions; as he acquired sufficient knowledge to reject baneful customs and superstitions; as he regarded more and more not only the welfare, but the happiness of his fellow-men; as from habit, following on beneficial experience, instruction, and example, his sympathies became more tender and widely diffused, so as to extend to men of all races, to the imbecile, maimed, and other useless members of society, and finally to the lower animals—so would the standard of his morality rise higher and higher (Darwin 1871, I:103).

Darwin sensed a conflict between his criterion of moral progress—the extension of sympathy—and his criterion of the good of the community. He noted that asylums, vaccinations, and medical care preserved weak or helpless persons at a general cost. “No one who has attended to the breeding of domestic animals will doubt that this must be highly injurious to the race of man” (Darwin 1882, 168). He worried that the careful and frugal tended to marry late in life and to have fewer children than the more careless and irresponsible members of the population. He insisted, however, that we must bear “the undoubtedly bad effects” of moral progress, strengthening this point in the second edition of the *Descent*: We cannot check our sympathy “even at the urging of hard reason, without deterioration in the noblest part of our nature” (Ibid. 134). The neglect of the weak would involve overwhelming present evil that could not be justified in the same way as the surgeon’s action of cutting out part of a diseased organ, by the prospect of a greater good. He consoled himself with the thought that “some elimination of the worst moral dispositions is always in progress”—through imprisonment and suicide—and that truly profligate men and women had few children (Ibid. 137, 162).

Criminality was a disease, Darwin believed, motives were merely “units in the universe,” and where moral failure was concerned, “We ought to pity & assist & educate by putting contingencies in the way to aid motive power” (Darwin 1987, 608).

One must view a wrecked man, like a sickly one—We cannot help loathing a diseased offensive object, so we view wickedness.—it would however be more proper to pity than to hate....Animals do attack the weak & sickly as we do the wicked—....[I]t is right to punish criminals; but solely to *deter* others” (Ibid.).

“This view should teach profound humility, one deserves no credit for anything,” Darwin concluded, “... nor ought one to blame others.” In a fashion reminiscent of the deterministic philosopher Baruch Spinoza, he decided that “This view will not do harm, because no one can be really *fully* convinced of its truth except man who has thought very much, & he will know his happiness lays [sic] in doing good & being perfect ...” (Ibid., 608). But he did not trust his thoughts on determinism and criminality to publication.

The (Partial) Renewal of Evolutionary Ethics

Not only philosophical and moral resistance but also the three most significant socio-political events of the twentieth century put an end to claims for the moral benefits of commercial and military competition, racial domination, and the purgation of unfit. The First World War, with its revolting, prolonged trench warfare and use of poison gas contradicted the supposition that war preserves the best, sending the weak to the wall. It was the flower of youth that had perished or that returned home sick, insane, or mutilated. The Great Depression put paid to the notion that individualism and unrestrained competition were natural and therefore good, and it stimulated the formation of labor unions and the institution of some features of state socialism such as national pensions for the aged. Hitler’s Third Reich and Stalin’s purges created disgust with eugenics programs and with the very idea of racial purity and superiority. Existentialists like Jean-Paul Sartre argued that human beings had no essential nature and were free and indeed obliged to act and to create regardless of the seeming constraints imposed by their circumstances.

In the last 50 years, a new set of preoccupations with sociability and psychology has emerged to replace the old evolutionary ethics of eugenics and human competitiveness. The theory of kin selection (Hamilton 1964), and the ethological discovery of reciprocal altruism (Trivers 1971) have shown how unselfish behavior can be advantageous to an organism or its genes, and cooperation, mating strategies, and moralistic aggression, the tendency of victims or observers of victimization to retaliate against offenders or to shun them, or expunge them from the community, have been studied within the broad context of game theory and decision theory. Consolation and pacification have been observed in some primates, who appear to have a sense of entitlement and fairness, as well as empathy. Franz DeWaal has argued eloquently that proto-moral dispositions are, as Darwin had maintained, the precursors of the human moral sense (De Waal 1996). The current consensus is that there exists a strong human propensity to assist kin and near neighbors, an indifference to or hostility towards strangers;

that there are divergent reproductive strategies in males and females that favor promiscuity and evasion of parental care in males and greater sexual selectivity and nurturance in females. These features are taken by many writers to be predictive of social conditions and structures, including war (Wrangham and Peterson 1996), racism (Barash 1979), and the subordination of women (Wilson 1978, Barash 1979).

Although it is often noted that explanation is not justification, the motive to eliminate, exclude, and differentiate on the basis of human differences remains prominent in the writings of evolutionary psychologists and ethicists. The old idea of heritable dispositions that fit some for lucrative and visible, others for menial, positions in the social world has been updated and clothed in new graphs and statistics. International conferences are still devoted to discussions of what used to be called degeneration, and research on the problem of the “unfit” continues enthusiastically in some quarters. As recently as 1994, Richard Herrnstein and Charles Murray performed the statistical experiment of “randomly deleting,” from a virtual population, individuals with an IQ of less than 103, which, they claimed, reduced poverty by 25% (Herrnstein and Murray 1994). E.O. Wilson, whose thoughts were influenced by his studies of the smooth functioning of social insect societies with their rigid divisions of roles—nurse ants, worker ants, and soldier ants—asserted in a 1995 paper (Wilson 1995) that “a schedule of sex-and age-dependent ethics can impart a higher genetic fitness than a single moral code which is applied uniformly to all sex-age groups.” He continued as follows:

If there is any truth to this theory of innate moral pluralism, the requirement for an evolutionary approach to ethics is self-evident. It should also be clear that no single set of moral standards can be applied to all human populations, let alone all sex-age classes within each population. To impose a uniform code is...to create complex, intractable moral dilemmas—these of course are the current condition of mankind (Wilson 1995, 164).

The results of Herrnstein and Murray’s bizarre and disturbing exercise would, I take it, make little sense to a real economist. Wilson’s views are in turn troubling for a number of reasons. First, “higher genetic fitness”—more descendants—is not a moral goal. “Genetic fitness” should not be confused with the vernacular conception of a “fit” person as healthy and happy (Matthen and Ariew 2002). Wilson provides no evidence to show that sex-dependent moral codes promote human health and happiness. The double standard in sexual morality and all the other mechanisms of inhibition and immobilization for women, from footbinding and veiling to claustration and occupational and educational segregation, would be difficult to defend as examples of welfare-enhancing policies. Wilson

implies that complex, intractable moral dilemmas arise from the attempt to apply uniform standards to very different people. One might suppose to the contrary that complex and difficult, though not necessarily intractable, dilemmas arise when divergent social roles are assigned to people who are basically similar to one another in many but not in all respects.

Biological Difference and Philosophical Universality

What is the crucial distinction between the philosophical and the biological approaches to morality that induced E.O. Wilson to suggest the appropriateness of a transfer of the responsibility for creating moral knowledge? It is sometimes implied that moral philosophers go awry in proposing that human beings have a species of free will that is incompatible with a scientific perspective on human action and that they maintain, contrary to all that is known about human populations and their intellectual propensities, that we are basically all alike and basically all respectful of abstract, rational considerations. While the influential eighteenth century moral philosopher Immanuel Kant certainly did hold views of this sort and while existentialists of the mid-twentieth century propounded radical and untenable views about free will, mainstream contemporary philosophers do not share them. They are, however, by and large committed to the moral principle that the same fundamental rights, duties, and entitlements pertain to all members of the species and that inequalities in well-being—liberty, security, and enjoyment of life—are unjustifiable unless they can be shown to contribute to the good of each person they affect. By tolerating variances in well-being, a society may be able to produce more objects, conditions, and events that are objectively desirable. But from a moral point of view, sex, race, and nationality, beauty, and intelligence *ought to have* no predictive value with respect to well-being—whether or not they have a predictive value with respect to income, prestige, executive authority, and other desiderata.

This conception of morality was implicit in the writings of the progressive Victorian reformers of Darwin’s era, but it is neither self-evident nor uncontroversial. It is opposed to a rival conception of morality as “giving to each his due,” where the level of desert is understood to vary according to sex, race, talent, might, lineage, and other such features. The extent to which universal well-being is secured by a practice is a useful yardstick for assessing claims by contemporary evolutionary ethicists to be contributing valid moral insights. If they endorse the standard, they should be prepared to defend their prescriptions by reference to it; if they reject it in favor of a different yardstick for moral decency or goodness, they

should be prepared to make explicit and defend the rival standard.

To expand on this point, morality appears to have two distinct functions. One, call it the “I–thou” function, is to regulate relations between individuals who are social equals but who can attain temporary positions of advantage over one another. Proscriptions against theft, fraud, perjury, and assault are intended to suppress advantage taking in situations in which one person is able to act invisibly, or is better armed, or has more information than another, or has some other source of leverage. In “I–Thou” situations, the advantage is temporary and might just as well have accrued to the other party had circumstances been somewhat different: All of us can steal, cheat, lie, and attack others. The emergence of I–Thou norms of helpfulness, truthfulness, restraint, and respect for property and persons, in the Environment of Evolutionary Adaptation lends itself to game-theoretic explanation. Persons who encountered one another frequently in the small group settings of our remote ancestors would be expected to internalize such norms and to evolve the disposition to abide by them and to shun or punish those who did not if it gave them an advantage in survival and reproduction. Furthermore, the evolved norms just cited appear to be good ones—ones we can endorse as good for social life in the contemporary world as well. Explanation and justification for I–Thou norms thus go hand in hand.

The second function of morality is not to be confused with the regulation of dyadic relationships between individuals. It concerns relationships of subordination that are long-lasting and irreversible in the normal course of events. Aristocrats and peons, employers and employees, masters and slaves, jailers and captives, inhabitants of the Northern Hemisphere and inhabitants of the Southern, and other groups and classes stand in relationships of domination and subordination to one another. In such relationships, while both parties may have access to sources of leverage that protect their interests, inequality is not accidental or opportunistic but institutionally entrenched, backed by law and custom. The second mandate for moral theory—call it the “Us–Them” function—is to assess the relationships that exist between groups of persons related in this way, for morality limits what members of one group can do to another for their benefit, or even for the average benefit of the community. Morality, in this second sense—the determination of the morally appropriate “uses” of entire classes of persons—presents a problem for the evolutionary ethicist.

The formation of Us–Them relationships typically implies the suspension of I–Thou morality; for deception, theft, and bodily injury may be practiced with impunity by the powerful. When we think of moral progress, however, it is the development of Us–Them morality that we, like the Victorian moralists, normally have in mind. But how can

evolutionary theory bear either on the explanation or the justification of Us–Them morality? Normal empathic emotions are rarely aroused in Us–Them relationships, as the parties are typically isolated from one another and individuals in one group do not know individuals of the other group personally and encounter them frequently. While in a sense, males and females of all dimorphic species “exploit” one another for reproductive purposes, genuinely parasitic relationships between subgroups of the same species have no models in evolutionary biology and are hard to conceptualize for the Environment of Early Adaptation with its small, nomadic populations. Hunter-gatherer societies are conspicuously egalitarian (Boehm 2000), and exploitation occurs principally in human societies in which there is field labor; the manufacture of articles in factory-like conditions; in which there are rulers, titles, laws, and economic sanctions that be applied to people; and walls, locks, chains, and certificates to hold them in or keep them out.

Ethical relations between groups did not and could not have emerged spontaneously in early human societies, as Darwin knew. They are a feature of civilization, not culture, and imply the existence of literacy, a legal system, and formal codes of conduct. For biology, and specifically evolutionary theory, to be able to take over successfully where the philosophers have allegedly failed to lay the conceptual groundwork for a just and comfortable world, it has to be shown how the biological perspective could contribute to the analysis of relations between groups. Yet evolutionary ethicists have tended, to the contrary, to endorse exploitative relationships—Pinker, for example, follows E.O. Wilson in commending workplace segregation by sex—arguing that insofar as the division of labor is based on important personality differences traceable to the reproductive roles of men and women, it cannot be considered unjust. Such conclusions seem at variance with Pinker’s claim that evolutionary psychology “can help lead the way to a realistic, biologically informed humanism...[and] offer a touchstone by which we can identify suffering and oppression wherever they occur...” (Pinker 2002, xi). For unless extraordinary measures for wage equalization independent of occupation are undertaken, the segregation of the workplace implies financial hardship and economic dependency for the sex that is, according to evolutionary psychologists, most in danger of abandonment by fickle males and most driven to care for its resource-hungry offspring.

The Role of the Social Sciences

There is a third source of insight, besides biology and philosophy, that is available to moral theory in the form of the social sciences—specifically, anthropology, sociology, and social psychology. It is common to disparage these

fields as combining the worst features of the natural sciences and philosophy; to accuse them of befuddling readers with mathematical models and statistical analyses while drawing merely speculative conclusions. A theory in natural science is often seen as validated by its applications. The theory is held to be true because it can be employed to satisfy our desires, whether they are for convenient plastic containers, warmth, cures for our ills, entertainment, or modes of communication and transport. Theories in the social sciences can rarely be validated by their applications, for we cannot manipulate human beings as we do molecules, and because we would regard it as not morally right to try to do so. Hence, there are obstacles both in assessing the truth of claims in the social sciences and in basing decisions upon them, insofar as we appear to have little experience of producing what we want by reference to them.

Nevertheless, moral theory—and public morals and legislation as well—have made significant progress from the late eighteenth century onwards, thanks to the social scientists—or their forerunners. The real expansion of moral understanding and social improvement began with the French encyclopedists and J.G. Herder in Germany, continuing with Marx and Engels, Henry Maine, Max Weber, L.T. Hobhouse, and Karl Mannheim, who established the modern historical and analytical theory of institutions. Their comparative studies of moral and legal codes and, in particular, the transition from codes based on status—one's position in society, nationality, ethnicity, religion, wealth, sex, occupation, and title—and one's powers over others, to codes of conduct based on reciprocal benefit and equal entitlement furnished the conceptual basis for modern philosophical egalitarianism.⁴ The engaged, participatory mode of anthropology initiated by Franz Boas, and his rejection of the teleological conception of history, according to which the civilized nations must either destroy or absorb and rule the primitive members of the species, was crucial to the formation of what Guy Stocking refers to as the “new paradigm of the social sciences” (Stocking 1968). Boas argued that the mental functions of abstract thought, the inhibition of impulses, and (as Darwin had so vigorously insisted) the application of aesthetic and ethical standards to objects, events, and persons, were common to all human beings (Stocking 1968, 220). “Culture” was universal, while “civilization” described an urbanized, militarized, commercial mode of life intrinsically no more valuable than any other form of culture. Describing the new paradigm, Stocking comments that it involved:

the rejection of simplistic models of biological or racial determinism, the rejection of ethnocentric

standards of cultural evaluation, and a new appreciation of the role of unconscious social processes in the determination of human behavior. It implied a conception of man not as a *rational* so much as a *rationalizing* being (Ibid. 232).

Can the biological sciences, whose early racist and militaristic extrapolations were refuted and rejected by the critical social sciences, re-emerge to cooperate with them? Can they do more than defend social inequalities and oppression as natural and inevitable in light of human biological differences? This is the key question for the future of evolutionary ethics. I would insist that the biological sciences can perform in this role but only to the extent that the field of evolutionary ethics can rise to the challenge of exploring the ways in which social oppression is based on mythology and ideology and to the extent that it can replace conventional beliefs with a scientifically more accurate image of people and their world.

Historically, moral and political policies have been based either upon mythologies of the supernatural or else mythologies involving nature. The belief in the special creation of species, in God's providential care for the world and everyone and everything in it, and in compensation for unjust suffering and retaliation for unpunished wickedness in the next life, are examples of moral supernaturalism that tend to promote ethical complacency and resignation where social inequality is concerned. On the naturalistic side, fanciful cosmological models of higher and lower powers and empirically false assumptions about the distribution of rationality and competence have served to rationalize oppression, maintaining the position of the parasitic classes of society—aristocrats, landowners, and priests—and not only allowing but also encouraging persecutory impulses. The new human sciences, predicated on the assumption that not only our bodies but also our minds and feelings as well are the products of a long evolutionary history, can potentially help us to frame a more accurate image of reality than folklore, philosophy, or the imaginations of novelists and dramatists. For as worthwhile as these cultural forms are, they are not sources of moral knowledge uncolored by bias and unwarranted assumptions.

As I noted at the beginning of this essay, human beings have no functions, no purposes, in virtue of which their qualities can be evaluated, except those they themselves decide to adopt. A person is, from the biologist's perspective, a temporary federation of replicators that are working to be represented in future generations, sometimes threatened, sometimes exploited, and sometimes assisted by other federations of replicators (Dawkins 1999). We exist not to glorify God, nor to exercise rationality, nor to bring about any particular conditions of society, but merely because we are assemblages of successful replicators.

⁴ The substitution of contract for status as the basic principle of law was explored by Maine (1851); Morgan (1877); and Hobhouse (1915).

Reproduction is the habitual practice of every organism; it is not the specialization of females, but of every living creature, and sooner or later, after the completion of this task, the individual dies. Furthermore, everyone now living is the descendant of ancestors whose qualities enabled them to survive and reproduce under demanding conditions—outfacing plagues, famines, natural disasters, and all the exigencies of social life and social conflict. In this respect, we are all biologically equal. Virtually all of us will have no descendants at all after some large number of generations have lived and died. In this respect, too, we are all biologically equal.

By employing empirical methods, we have learned that people value fairness in many cases more than they do profit, that performance on IQ tests is heavily dependent on early exposure to categorical reasoning (Flynn 1994, 1999), that there are more women with extraordinary mathematical ability than might be supposed from an inspection of university faculties (Spelke 2005), and that early humans were likely “cooperative breeders” who raised their children in all female subgroups rather than in male–female pairs (Hrdy, 1999). We have also learned that human beings are subject to systematic distortions in their perceptions of responsibility and guilt, most likely for reasons that reflect age-old habits of cognition of causes and the interpretation of the social world (Lerner 1980). More recently, studies of “cognition in the wild” (Hutchins 1996), the “adapted mind” (Barkow et al. 1992), “ecological rationality” (Gigerenzer et al. 1999), and the origins of religious faith in innate human biases and predispositions (Atran and Norenzayan 2004) have shed light on the formation of both rational and irrational beliefs and belief systems. All this is morally important knowledge. But even if it constitutes genuine knowledge, a problem remains. How can what is the case have any definite implications for morality? Putting the question in traditional philosophical terms, how is ought to be derived from is?

To make headway on this question, we need first to give up the notion that some ideal natural science of the future would enable us to deduce a complete set of moral prescriptions that would supplant the various codes with which various cultures and subcultures currently operate and be obligatory for everyone, on pain of ostracism or punishment. This is an absurd and even frightening fantasy, bearing no relation to the way in which moral theory actually advances and moral progress occurs. Rather, history indicates that moral progress in Us–Them relationships occurs when both the costs and consequences of the relationship become clearer and more vivid to all parties involved and when alternatives to an oppressive practice become not only imaginable but are also recognized as practicable. Consider the persecution of homosexuals, against which E.O. Wilson

once protested on biological grounds: We now grasp that homosexuality is no more unnatural than heterosexuality, just less frequent; that heterosexual relationships will still be forged and children will continue to be born, even if homosexual marriage is legalized; and that interference with their companionship preferences and stigmatization has driven good people to desperation and suicide, which the psychological uplift produced in their persecutors can hardly be supposed to justify.

A morally important category of costs—perhaps the most important category—consists in the repression or suppression of what earlier writers termed “instincts.” As Darwin pointed out, animals must be uncomfortable in not being able to do, and comfortable in doing, what is “instinctive” (Darwin 1987, 67–8). This crucial observation points to a pathway—however bestrewn with conceptual obstacles the pathway may be—between morality and science, indeed between morality and evolutionary theory. It is distressing to be deprived of food, water, breathable air, and space, and such deprivations have no justification except possibly punishment. By extension, to deprive people of the opportunity to practice courtship rituals, to engage in diurnal cycles of activity and inactivity, to roam and forage independently, and to socialize with others whom they like and avoid those whom they do not, is a form of punishment, insofar as these activities are experienced as pleasurable by most members of our species. Accordingly, one ought not to try to change or repress ancient patterns unless there are strong reasons for doing so. Either the attempt will likely produce stress if repression is successful, or it will consume resources to no avail if it is not. Furthermore, if some alternative practice or form of social organization would permit people to act in ways that were more natural, hence more pleasurable and satisfying, it is preferable, other considerations being equal. Many of the benefits of civilization require some degree of repression of human spontaneity. However, by accepting some sacrifices in efficiency and productivity, we might well be able to purchase a society with less stress and depression, as well as less violence and ugliness.

The appeal to biological knowledge should accordingly be employed for critical and revisionary, not foundational purposes. Let me give some further examples. First, if factory labor has morally objectionable features, this cannot be so merely because it assigns to the capitalist the surplus value of the laborer. For one might reasonably ask: and what is so bad about that assignment? A deeper reason must be sought, and it can be found in the pleasure human beings take in crafting articles of daily and special-occasion use according to their own and their community’s aesthetic standards—the craftsman’s instinct that is typical of a *habile* and ingenious species. Agricultural field work,

factory work, and desk work are the three economic supports for civilized life, but they do not, for the most part, gratify this instinct. While we cannot reproduce the labor environment of the putative Environment of Early Adaptation and continue to consume and experience as we currently do, we can in principle adjust workplace conditions and surroundings to make them more natural and reduce consumption so as to reduce the hours that have to be worked under unnatural conditions.

Second, if the exclusion of women from the professions, government, and the priesthood is morally unjustifiable, the argument cannot be made merely on the basis of the equality of their souls; it should rest on the fact that men and women are no different in their basic cognitive apparatus, their analytical ability and creativity, or their interest in what happens in their world and in their neighborhood, and that to deprive them of the opportunity to exercise their capabilities is to do them moral harm. Finally, if our current laws and customs provide poorly for parents and children in the event of marital breakdown, this is not because a few human beings are willful, selfish, and neurotic and deserve the anguish and chaos they generate. By reframing laws and institutions on the assumption that untroubled, lifelong sexual exclusivity is not the expected condition of members of our species and that people are prone to change their preferences, to experience extremes of jealousy and despair at abandonment and to feel strongly possessive about and protective of their children, we might find ways to protect people from the worst consequences of their own emotionality. All social changes are somewhat costly, not only because most entrenched cultural practices have some positive rationale but also because change as such can be stressful, and side effects are often unanticipated.⁵ Nevertheless, where human welfare can be enhanced with minimal disruption, it is morally right to try to bring this about.

Ambivalence and the Construction of Moral Codes

In the same essay that recommended the imposition or preservation of sex- and age-dependent moral codes that I have been questioning, E.O. Wilson advanced a notion that is as significant for moral theory as the notion of norms dictated by universal, evolutionarily acquired preferences and indeed ultimately more useful, namely ambivalence. Behavioral responses, he noted, “must bring into play an

efficient mixture of personal survival, reproduction, and altruism.” Consequently,

the centers of the complex tax the conscious mind with ambivalences whenever the organisms encounter stressful situations. Love joins hate; aggression, fear; expansiveness, withdrawal and so on; in blends designed not to promote the happiness and survival of the individual, but to favor the maximum transmission of controlling genes. These ambivalences stem from counteracting pressures on the units of natural selection (Wilson 1995, 155).

Insofar as a unit of selection may be a gene, or some other tiny replicator, an individual organism, or a group, our emotional states reflect “the balance of counteracting selection forces at different levels.” Altruism may conflict with sexual motives, love of offspring with selfishness.

As Christopher Boehm observes, developing this point, the fundamental ambivalences generated by biological demands are universal, as human practices governing childhood, sex, and death and dying are not (Boehm 1989). The variety of norms governing killing, insulting, harming, using, defrauding, and interfering and allowing in sexual and parental behavior represent the different strategies societies have adopted to manage these conflicts. Moral codes specify how some dilemmas involving conflicting biological imperatives are to be resolved and so tend to the resolution of ambivalence, though the adoption of a moral code can itself generate ambivalence about abiding by the norm, and moral systems themselves are notoriously productive of dilemmas. Within the constraints imposed and the practices they know to be approved and disapproved by their societies, ambivalent individuals make choices as well. They decide how faithful, how conniving, how punitive, repressive or tolerant, or nurturing to be. Furthermore, they decide differently, and there is no guarantee that their actions achieve the goals that nevertheless explain them. There is often no objective answer to the question whether a particular practice is morally optimal, for there are many competing standards of success and failure. The goals we have—collective and personal achievement, minimization of suffering, and individual development—conflict, insofar as the compromises that can promote one may not promote the others.

Ambivalence, oscillation, and plain incoherence further result from the overlay of the biological platform with a cloudy blend of recognition and misapprehension where our own long-term rational interests are concerned. We romanticize living nature and feel well amidst plants and animals, in the fresh air and sunlight, but we destroy, poison, and obscure them for the sake of money in the bank. We adore our progeny and sacrifice for them,

⁵ Dilemmas of stasis and change are discussed in Wilson 2004. esp. Chaps. 4 and 8.

individually and collectively, while regarding them in some respects as inconvenient and negligible where their long-term interests are concerned. As a society, we are apt to venerate the abstract notion of social equality and to maintain that we, inhabitants of Western democracies, are all equal now while accepting egregious differences in health status, income, and satisfaction with life among groups as inevitable, or inexplicable, or as caused by the fortunate or unfortunate agents themselves. To bring these conflicts and confusions to light and to explore new ways of managing them is a task for moral theorists of the present and of the future. We should bear in mind that the Environment of Evolutionary Adaptation, where our original competencies and dispositions were formed, was a very different place, one in which human beings lived in small groups of perhaps 10–30 individuals, comprised largely of kinfolk. The minds and emotions we have inherited are, as Richard Dawkins puts it, “out of date, built under the influence of genes that were selected in some earlier era” (Dawkins 1999, 35).

Concluding Postscript

By way of attempting a *reductio ad absurdum* of the position of certain genetic determinists, let me observe that if (what is, of course, not the case) the IQ of every person was equal to the numerical average of the IQs of his or her two parents and if our society was perfectly “meritocratic” in awarding to each person a salary of \$1,000 per year per IQ point, economic inequality, as we currently experience it, would vanish and with it much of the variance in well-being, between individuals and between groups as well. The irrelevance of the heritability of traits where questions of welfare are concerned and the way in which our existing institutions redistribute welfare in ways that have no basis in nature are both evident from this simple example. To take the notion of Darwinian morality seriously, we should not be seduced into thinking that political and social reality are captured in the caricatures of territorial apes, harem-keeping males, and drab, coy females who roam the popular literature on evolutionary ethics. We should remain vigilant about and critical of claims regarding the suitability and unsuitability of entire groups of persons for various social roles. We can do no better than to return to Darwin’s original concerns with the basic panhuman similarity in intellectual capability and emotional reactions, with the enlargement of the role of sympathy in advanced moral codes, and with the recognition that strange customs and irrational policies are as much the free products of human invention as the plays, pictures, and palaces that represent the pinnacle of artistic achievement or the results of science and mathematics.

References

- Atran S, Norenzayan A. Religion’s evolutionary landscape: counter-intuition, commitment, compassion, communion. *Brain Behav Sci*. 2004;27:713–70.
- Barash D. *The whispering within: evolution and the origin of human nature*. Middlesex: Penguin; 1979.
- Barkow J, Cosmides L, Tooby J, editors. *The adapted mind: evolutionary psychology and the generation of culture*. New York: Oxford University Press; 1992.
- Bellomy DC. Social Darwinism revisited. *Perspectives in American History*. 1984;1:1–129.
- Boehm C. Ambivalence and compromise in human nature. *American Anthropologist N Ser*. 1989;91:921–39.
- Boehm C (2000) Conflict and the evolution of social control. In: Katz LD, editor. *evolutionary origins of morality: cross-disciplinary perspectives*. *Journal of Consciousness Studies* 7: 1 & 2, 79–101
- Crook P. *Darwinism, war and history: the debate over the biology of war from the “Origin of Species” to the First World War*. Cambridge: Cambridge University Press; 1994.
- Darwin C (1865) “Hypothesis of Pangenesis.” Unpublished manuscript CUL-DAR51.C36-C74. Available online at <http://darwin-online.org.uk/content/frameset?viewtype=text&itemID=CUL-DAR51.C36-C74&keywords=pangenesis&pageseq=1>
- Darwin C. *The descent of man, and selection in relation to sex*. London: Murray; 1871.
- Darwin C. *Descent of Man*. 2nd ed. London: Murray; 1882.
- Darwin C. In: Barlow N, editor. *Autobiography*. London: Collins; 1958.
- Darwin C. *Charles Darwin’s notebooks, 1836–1844*. In Barrett PH, Gauntrey PJ, Herbert S, Kohn D, Smith S, editors. Ithaca NY: Cornell University Press; 1987.
- Dawkins R. *The extended phenotype*, rev. ed. Oxford University Press: Oxford; 1999.
- De Waal F. *Good natured: the origins of right and wrong in humans and other animals*. Harvard University Press: Cambridge; 1996.
- Farber P. *The temptations of evolutionary ethics*. Berkeley: University of California Press; 1998.
- Flynn JR. IQ gains over time. In: Sternberg RJ, editor. *Encyclopedia of human intelligence*. New York: Macmillan; 1994. p. 617–23.
- Flynn JR. Searching for justice: the discovery of IQ gains over time. *Am Psychol*. 1999;54:5–20. doi:10.1037/0003-066X.54.1.5.
- Gigerenzer G, Todd PM, ABC Research Group. *Simple heuristics that make us smart*. New York: Oxford University Press; 1999.
- Hamilton W. *The Genetical Evolution of Social Behaviour I and II*. *J Theor Biol*. 1964;16:1. 17–52.
- Herrenstein R, Murray C. *The Bell curve: intelligence and class structure in American life*. New York: Free Press; 1994.
- Hobhouse LT. *Morals in evolution*. New York: Holt; 1915.
- Hrdy S. *Mother nature: maternal instincts and how they shape the human species*. New York: Ballantine; 1999.
- Hutchins E. *Cognition in the wild*. 2nd ed. Cambridge: MIT Press; 1996.
- Huxley TH. *Evolution and ethics*. Amherst: Prometheus; 2004 (originally published in 1892).
- Kitcher P. *Vaulting ambition*. Cambridge: MIT Press; 1987.
- Lerner MJ. *The belief in a just world*. New York: Plenum; 1980.
- Maine H. *Ancient law, its connection with the early history of society and its relation to modern ideas*. London: Murray; 1851.
- Malthus TR. *An essay on population*, 2nd edn. Cambridge: Cambridge University Press; 1803 (Reprinted as Malthus TR, *Essay on the principle of population*. In Winch D, editor, 1992)
- Marchant J. *Alfred Russel Wallace: letters and reminiscences*. London: Cassell; 1916.

- Matthen M, Ariew A. Two ways of thinking about fitness and natural selection. *J Philos*. 2002;94:55–83. doi:10.2307/3655552.
- Maynard Smith J. *Evolution and the theory of games*. Cambridge: Cambridge University Press; 1982.
- Mill JS (1904) *On nature, the utility of religion, and theism*. London: Watts and Cape (original work published in 1875 as *On nature*).
- Morgan LH. *Ancient society: researches in the lines of human progress from savagery through barbarism to civilisation*. London: MacMillan; 1877.
- Pinker S. *The blank slate: the modern denial of human nature*. New York: Viking; 2002.
- Romanes GJ. *Mental evolution in man*. New York: Appleton; 1893.
- Skyrms B. *The evolution of the social contract*. Cambridge: Cambridge University Press; 1996.
- Sober E, Sloan Wilson D. *Unto others: the evolution and psychology of unselfish behaviour*. Cambridge: Harvard University Press; 1998.
- Spelke ES. Sex differences in intrinsic aptitude for mathematics and science: a critical review. *Am Psychol*. 2005;60:950–8. doi:10.1037/0003-066X.60.9.950.
- Stocking GW. *Race, culture and evolution*. New York: Free Press; 1968.
- Trivers R. The evolution of reciprocal altruism. *Q Rev Biol*. 1971;46:35–57. doi:10.1086/406755.
- Trivers R. Parental investment and sexual selection. In: Campbell, B, editor. *Sexual selection and the descent of man 1871–1971*. Aldine: Chicago; 1972, pp. 136–79.
- Trivers R. *Social evolution*. Menlo Park: Benjamin/Cummings; 1985.
- Wilson C. *Ideals and constraints in moral theory*. Oxford: Clarendon; 2004.
- Wilson EO. *Sociobiology*. Cambridge: Harvard University Press; 1975. p. 562.
- Wilson EO. *On human nature*. Cambridge: Harvard University Press; 1978.
- Wilson EO. The morality of the gene. In: Thompson P, editor. *Issues in evolutionary ethics*. Albany: State University of New York Press; 1995. p. 153–65.
- Wrangham R, Peterson D. *Demonic males: apes and the origins of human violence*. London: Bloomsbury; 1996.