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**Evolutionary Ethics: An Idea Whose Time Has Come?**

**An Overview and an Affirmation**

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Evolutionary ethics is a subject that has been debated ever since Darwin's day. The basic issue, in a nutshell, is whether or not human ethical systems can be explained — and justified — in terms of evolutionary principles. In recent years there has been an upsurge of publications devoted to this issue, including many new books (as well as a number of books on Darwinism and religion) and countless journal articles. Indeed, an Internet search using the term “evolutionary ethics” yielded 65,400 citations of various kinds.<sup>1</sup> As this outpouring of publications suggests, there has been a great diversity of views on the subject over the years.

However, some major sea changes have been occurring recently in evolutionary theory generally and in our perspective on human evolution in particular, and these changes have major implications both for our ethics and our understanding of the moral impulses that shape our lives and societies. This Harrison Symposium explores these implications. In this essay, I critique the history of evolutionary ethics, concluding with an argument favoring the proposition that our ethical systems are products of our evolution and are genetically grounded; they are more than simply cultural inventions, or the actualized ideas of ancient philosophers.

**Darwin's Ideology**

We begin with Charles Darwin himself. Darwin's views about human nature and the evolution of human societies were developed in the first half of *The Descent of Man* (1871),<sup>2</sup> and in *The Expression of the Emotions in Man and Animals* (1873).<sup>3</sup> The principal thesis of these works was

that the human species had arisen through the same materialistic processes that governed the rest of the natural world and that *Homo sapiens* shares a common descent with all other animals, including a very close relationship with the “higher” non-human primates. But more important for our purpose, Darwin attributed our dominant position in nature and our remarkable cultural attainments to evolved social, moral, and mental faculties, in combination with our language abilities.<sup>4</sup>

Though often portrayed as an apologist for cut-throat competition, Darwin in reality placed our sociality and our moral faculties highest among those qualities that have contributed to our success as a species. Following a discussion in *The Descent of Man* devoted to the role of social behavior and sympathy (what contemporary sociobiologists would call altruism) in various animal species, Darwin dealt at length — though in a speculative fashion — with “Man as a Social Animal.”<sup>5</sup> In essence, he proposed that our moral systems should henceforth be studied as a branch of “natural history” — that is, within an evolutionary framework. Darwin’s “take” was that morality is indeed a product of the evolutionary process. He believed that our “social instincts,” including even our capacity for “sympathy,” “kindness,” and the desire for social “approbation,” are rooted in human nature. The rudiments of these behaviors, he pointed out, can be found in other social species as well.

Darwin also stressed the role of social cooperation, reciprocity and “mutual aid” in human evolution, especially in food-getting but also in conflicts with other groups and other species:

In the first place, as the reasoning powers and foresight of the members became improved, each man would soon learn that if he aided his fellow-men, he would commonly receive aid in return. From this low motive he might acquire the habit of aiding his fellows. And the habit of performing benevolent actions certainly strengthens the feelings of sympathy which gives first impulse to benevolent actions....But another and much more powerful stimulus to the development of the social virtues is afforded by the praise and blame of our fellow-men...and this instinct no doubt was originally acquired, like all other social instincts, through natural selection.<sup>6</sup>

Darwin was well aware of the fact that these social instincts might seem at first glance to contradict the imperatives of natural selection and his own admonition, in *The Origin of Species*, that no organism can evolve an adaptation for the “exclusive good” of some other, unrelated organism. This would falsify his theory. Accordingly, Darwin proposed a solution to this puzzle that now goes under the heading of “multi-level selection” theory. In modern terminology, Darwin suggested that natural selection operated at three different “levels” — between individuals, between “families” of close kin and between social groups — and that it was possible for the three forms of selection to be aligned with one another rather than being in conflict; there are many forms of “mutualistic” cooperation that may simultaneously benefit individuals, families and groups. Indeed, Darwin believed that competition between various “tribes” (“group selection”) also played a major role in shaping the course of human evolution. “Natural selection, arising from the competition of tribe with tribe...would, under favourable conditions, have sufficed to raise man to his high position.” The tribes that were the most highly endowed with intelligence, courage, discipline, sympathy and “fidelity” would have had a competitive advantage, he argued. Alluding directly to the inherent tension in human societies between competition and cooperation, Darwin observed that:

Selfish and contentious people will not cohere, and without coherence nothing can be effected. A tribe rich in the above qualities would spread and be victorious over other tribes; but in the course of time it would, judging from all past history, be in its turn overcome by some other tribe still more highly endowed. Thus the social and moral qualities would slowly tend to advance and be diffused throughout the world.<sup>7</sup>

In sum, Darwin believed that socially-organized groups — and the moral systems that gave them “coherence” — played a key role in human evolution.<sup>8</sup> Organized human societies are not simply cultural artifacts; they are products of our evolution as a species and have played a vital role in the success of our ancestors over many thousands of generations.

### **Herbert Spencer’s Ethics**

Darwin himself did not venture explicitly into the realm of evolutionary ethics, but one of his important contemporaries did. It was the polymath and social theorist Herbert Spencer — considered by many in the 19<sup>th</sup> century to be the preeminent thinker of his age — who was in fact the founding father of evolutionary ethics. It was Spencer, not Darwin, who coined the slogan “survival of the fittest.” And it was Spencer, in his early diatribes against the power of the “state” as a young ideologue and polemicist, who inspired Social Darwinism.

However, Spencer’s views changed as he matured, and in his monumental ten-volume *Synthetic Philosophy*, Spencer advanced a much more balanced view of society and ethics. Following Darwin’s lead, Spencer grounded his paradigm in the recognition that human societies are based on cooperation, not competition: “Cooperation...is at once that which cannot exist without society, and that for which society exists,” we wrote in *The Principles of Sociology* (1874-75). “The motive for acting together, originally the dominant one, may be defense against enemies; or it may be the easier obtainment of food, by the chase or otherwise; or it may, and commonly is, both of these.”<sup>9</sup>

Spencer viewed society as a utilitarian instrumentality — a system of exchanges and mutual benefits that arose out of “the struggle for existence.” Moreover, the “progressive” evolution of human societies over time has been the result of an *interaction* between what would now be called ecological, psychological, and socioeconomic forces, including both cooperative and competitive (or even antagonistic) relationships.<sup>10</sup>

One aspect of Spencer’s formulation should be stressed, namely, that he pointedly suggested a basis for resolving one of the more vexing problems in social theory — the nature of the relationship between the individual and society, and the causal potency of each in social behavior and social change. To Spencer, human nature — our psychological propensities and mental faculties — and society itself were involved in a coevolutionary process: “The phenomena of social evolution are determined partly by the external actions to which the social aggregate is exposed and partly by the nature of its units [individuals]...observing that these two sets of factors are themselves progressively changed as society changes.”<sup>11</sup>

Accordingly, Spencer’s “science of ethics,” which established the foundation for what later came to be known as “evolutionary ethics,” was derived from his understanding about the nature of a society. As articulated in *The Principles of Ethics* (1892-93), the final two-volume unit of his

encyclopedic opus, the “science of right living,” as Spencer called it, consisted of an application of the scientific method to the problem of determining which ethical principles and moral precepts would best be able to harmonize a given society at its particular stage of evolution. The criteria for evaluating ethical issues should be their consequences both for the “super-organism” (actually, it was Spencer who coined this term) and its members, recognizing their interdependence:

So that from the biological point of view, ethical science becomes a specification of the conduct of associated men who are severally so constituted that the various self-preserving activities, the activities required for rearing offspring, and that which social welfare demands, are fulfilled in the spontaneous exercise of duly proportioned faculties, each yielding when in action its quantum of pleasure; and who are, by consequence, so constituted that excess or defect in any one of these actions brings its quantum of pain, immediate and remote.<sup>12</sup>

In other words, ethical prescriptions and sanctions must be tailored to the results that they are likely to produce in specific contexts with respect to the ultimate purpose of society — the greatest happiness (broadly interpreted) of the greatest number, but with an appreciation also for the fact that individual satisfactions in complex societies are both biologically based and very often interdependent; there is also a “public interest.”

### **A “Gladiators’ Show”**

Spencer’s newborn science of evolutionary ethics was almost immediately disputed when the well known biologist of that era, Thomas Henry Huxley (dubbed “Darwin’s bulldog” for his vociferous public defenses of Darwin’s theory), spoke out on this subject in his famous (some say infamous) Romanes lecture of 1893.<sup>13</sup> Huxley shocked his listeners, and subsequent readers, by disavowing Darwinism as a basis for ethics. The “cosmic process,” as Huxley called it, is nothing but “relentless combat” — a war of every man against every man in Hobbes’s dour image. Huxley also characterized the natural world a “gladiators’ show” in which the losers go to the wall. Nature is, indeed, “red, in tooth and claw” (in poet Alfred Lord Tennyson’s famous phrase).

So how can one build a social ethics on this model of evolution? How indeed? Huxley had painted himself into a corner in which he could not find any ethical corollaries. The only way to avoid this trap was to promote the human capacity to transcend nature: “Social progress means a checking of the cosmic process at every step and the substitution for it of another, which may be called the ethical process...” By substituting the “State of Art” for the “State of Nature,” Huxley claimed, human societies could ensure the survival of those who are ethically the best. (This begs the question, of course — why bother?) Huxley likened the process of cultural improvement to that of a gardener who transforms nature into an ordered regime.

Not surprisingly, Huxley’s dim view of evolutionary ethics prompted a number of public rebuttals, including one by the famed philosopher and educator John Dewey:

I have discussed this particular case [Huxley’s garden metaphor] in the hope of enlarging somewhat our conception of what is meant by the term “fit”; to suggest that

we are in the habit of interpreting it with reference to an environment which long ago ceased to be. That which was fit among animals is not fit among human beings...because the conditions of life have changed, and because there is no way to define the term “fit” excepting through these conditions. The environment is now a distinctly social one, and the content of the term “fit” has to be made with reference to social adaptation...We have then no reason here to oppose the ethical process to the natural process.<sup>14</sup>

Another critic, Leslie Stephen, expanded on Dewey’s argument by pointing out that morality can be based on purely prudential grounds. Following Spencer’s reasoning, men may find that peace is preferable to war, that the division of labor and reciprocity can be mutually advantageous and that a personal morality can be derived from our dependence on others for the meeting of our needs. A set of ethical rules — and a system of enforcement designed to prevent anyone from cheating — are in our own best interest. Stephen concluded: “An individualism which regards the cosmic process as equivalent simply to an internecine struggle of each against all must fail to construct a satisfactory morality, and I will add that any individualism which fails to recognize fully the social factor, which regards society [merely] as an aggregate instead of an organism [i.e., Spencer’s “super-organism”], will, in my opinion, find itself in difficulties.”<sup>15</sup>

### **The “Law of Competition”**

If Huxley at least held out the hope that we could rise above our beastly nature, the Social Darwinists extolled its virtues. Social theorists including William Graham Sumner, E. B. Tylor, Albert Keller, Gustav Ratzenhoffer, and others took their inspiration from Spencer’s “survival of the fittest” image and emphasized raw competition. Fairly typical was this *pronunciamento* by Tylor: “The institutions which can best hold their own in the world gradually supersede the less fit ones, and...this incessant conflict determines the general resultant course of culture.”<sup>16</sup>

Likewise, business magnate John D. Rockefeller, in a Sunday school address, assured his audience that “The growth of large business is merely a survival of the fittest....This is not an evil tendency in business. It is merely the working out of a law of nature and a law of God.”<sup>17</sup> However, it was the steel baron and philanthropist, Andrew Carnegie — never a man to mince words — who penned the most inflammatory expression of the Social Darwinist credo in an 1889 essay entitled “The Gospel of Wealth.” “While the law [of competition] may be sometimes hard for the individual, it is best for the race, because it ensures the survival of the fittest in every department. We accept and welcome, therefore...great inequality of environment, the concentration of business, industrial and commercial, in the hands of the few, and the law of competition between these, as being not only beneficial, but essential for the future progress of the race.”<sup>18</sup>

The opposing side in this increasingly harsh debate was perhaps most eloquently represented by the Russian émigré anarchist and naturalist, Prince Pyotr Kropotkin. In his famous polemic, *Mutual Aid: A Factor of Evolution* (1902), Kropotkin specifically refuted Huxley’s tooth-and-claw image of the natural world. Among other things, Kropotkin argued that there was abundant evidence of cooperation in nature that falsified Huxley’s one-sided interpretation of Darwin’s theory. “During the journeys which I made in my youth in Eastern Siberia and Northern Manchuria...I failed to find — although I was eagerly looking for it — that bitter struggle for the means of subsistence, *among animals*

*belonging to the same species* [his emphasis], which was considered by most Darwinists (though not always by Darwin himself) as the dominant characteristic of the struggle for life...”<sup>19</sup> Kropotkin claimed that cooperation is more important than competition in nature and is the key to “progressive” evolution. Kropotkin also insisted that social groups were important units of evolution.

### **The Modern Synthesis**

During the period of the so-called “Modern Synthesis” in evolutionary biology, from the 1930s to 1960s, biologists generally seemed comfortable with the idea of evolutionary ethics. For instance, both Julian Huxley (grandson of T. H. Huxley) and Theodosius Dobzhansky wrote approvingly about this subject.<sup>20</sup> The Modern Synthesis was also deemed to be compatible with “group selection” of various kinds, just as Darwin had proposed. For instance, Sewall Wright at the University of Chicago coined the term “interdemic selection” — i.e., selection between discrete breeding populations, or “demes” — and he developed what he called a “shifting balance” model, which he believed was of the utmost importance in producing evolutionary changes.<sup>21</sup> Ernst Mayr, likewise, characterized evolutionary change as a population-level phenomenon, meaning that populations and species are the ultimate units of evolution, not individuals. Mayr also developed what he called the “founder principle,” which envisioned small, reproductively isolated groups as a significant source of evolutionary innovation.<sup>22</sup> Meanwhile, various students of animal behavior, such as William Morton Wheeler and Warder C. Allee, stressed the cooperative aspect of animal behavior and social life. Wheeler also promoted the idea of “emergent evolution,” and he borrowed from Spencer the idea that a socially-organized group can be likened to a “superorganism”.<sup>23</sup>

However, a sharp discontinuity occurred in evolutionary theory in the 1960s. It was triggered when biologist Vero C. Wynne-Edwards made himself a stalking horse, in Edward O. Wilson’s characterization, by propounding a seriously overstated version of the group selection hypothesis in his (subsequently) much-maligned book, *Animal Dispersion in Relation to Social Behaviour* (1962). Wynne-Edwards asserted that group-living animals regularly display behaviors which involve the curtailment of their own personal fitness for the good of the group (for example, through “conventional” controls on reproduction that serve to limit population densities). “The great benefit of sociality,” Wynne-Edwards claimed in a companion article in *Nature*, “arises from its capacity to override the advantage of individual members in the interest of the survival of the group as a whole”<sup>24</sup>

### **Enter Neo-Darwinism**

Although the attack on group selection theory began with William D. Hamilton’s now classic papers on inclusive fitness theory (or “kin selection”) in 1964,<sup>25</sup> it was fully elaborated in George C. Williams’s New Testament — *Adaptation and Natural Selection* (1966). This legendary book was in many respects a therapeutic cold bath that served to cleanse evolutionary theory of some sloppy thinking. However, Williams also took an extreme position, from which he has since retreated, to the effect that selection at any higher level than that of an individual is essentially “impotent” and is “not an appreciable factor in evolution.”<sup>26</sup>

Another broadside against group selection theory occurred when Richard Dawkins published his ideologically-tinted popularization with the cunningly anthropomorphic title *The Selfish Gene* (1976). According to Dawkins, “we are survival machines — robot vehicles blindly programmed to

preserve the selfish molecules known as genes.” With evident relish, Dawkins opined: “I think ‘nature red in tooth and claw’ sums up our modern understanding of natural selection admirably.”<sup>27</sup> It is not surprising that *The Selfish Gene* became both controversial and a best-seller.

One of the chief casualties of the Neo-Darwinian “revolution” was Darwin’s explanation for human evolution, along with his reasoning about our social and moral faculties. Thus, for example, the philosopher Helena Cronin, in a popular 1991 book, *The Ant and the Peacock*, came to the conclusion that Darwin “lets us down.”<sup>28</sup> Why so? Because he relied on the supposedly flawed concept of group selection in explaining human evolution. Likewise, the science writer Robert Wright, in a provocative popularization about the new field of evolutionary psychology called *The Moral Animal* (1994), wrote off Darwin’s explanation of humankind altogether: “The more you think about it, the less likely it seems.” Despite his book’s affirming title, Wright concluded that we are not moral animals after all but only “potentially” so; what passes for morality is “ruthlessly” subordinated to our self-interests, he declared.<sup>29</sup>

### **Reviving Darwin’s Darwinism**

As I have discussed in some detail elsewhere,<sup>30</sup> the rejection of Darwin’s Darwinism, and of Spencer’s evolutionary ethics, was largely the result of two serious, interrelated misconceptions. The first was that cooperation and sociality depend on “altruism” and are therefore severely constrained phenomena. To the first generation of Neo-Darwinians and sociobiologists, it seemed that only kin selection (and maybe “reciprocal altruism”) might be able to circumvent this obstacle, since group selection was widely viewed as being impotent. The second misconception was that true ethics necessarily requires altruism; enlightened self-interest does not count. In short, it was a classic double bind.

With regard to the first issue, the tendency to equate altruism and cooperation was clearly misguided, and the current revival of group selection theory in evolutionary biology can be attributed, in considerable measure, to a growing recognition that cooperation can often be a “win-win” process; cooperating groups might provide mutual advantages to their members. To be sure, cooperation may impose costs on the cooperators, but these may be offset by equivalent or greater benefits. In short, cooperation can also involve the relatively straightforward “economic” calculus of costs and benefits, and the main constraint may be how these costs and benefits are toted up and distributed among the cooperators — and whether or not the tendency to cheat (defect) is “policed.” In other words, cooperation does not by definition require genes for altruism; there can be “egoistic cooperation” as well as “altruistic cooperation.”

Indeed, one of the most important forms of cooperation in nature involves interactions that produce combined effects (synergies) that are largely self-policing because they are interdependent. This is frequently the case with symbiotic relationships, as well as in socially organized species that exhibit a division of labor, or teamwork. Maynard Smith and Eörs Szathmáry, have suggested a useful metaphor to illustrate this distinction. Suppose that two oarsmen decide to cooperate in rowing a small boat across a river. In one alternative configuration, a “sculling” arrangement, the oarsmen each have two oars and row in tandem. In this situation, it is possible for one oarsman to slack off — to cheat — and let the other one do most of the work. This is a classic game theoretic relationship.

Now imagine instead a “rowing” arrangement. In this configuration, each oarsman has only one

opposing oar. Now their relationship (and the performance of the boat) is interdependent. If one of the oarsmen slacks off, the boat will go in circles and will not reach its goal. Interdependence has the effect of making a cooperative relationship self-policing. Maynard Smith and Szathmáry conclude that the rowing model is a better representation of how cooperation (and complexity) evolves in nature. “The intellectual fascination of the Prisoner’s Dilemma game may have led us to overestimate its evolutionary importance.”<sup>31</sup>

As the evidence for cooperation as a widespread phenomenon in nature has continued to mount in recent years, it has become increasingly clear that it is not a minor theme, or a phenomenon that depends on altruism or some hypothetical cooperative gene. Cooperation is a common response to the problems of living — a major survival strategy that is co-equal with competition in its importance. Indeed, competition *via* cooperation is a common strategy in the natural world. Even some of the most vociferous Neo-Darwinians have conceded as much, though their declamations are sometimes buried deep inside their texts. Consider these examples from Richard Dawkins:

In natural selection, genes are always selected for their capacity to flourish in the environment in which they find themselves....But from each gene’s point of view, perhaps the most important part of its environment *is all the other genes that it encounters* [his emphasis]....Doing well in such environments will turn out to be equivalent to “collaborating” with these other genes.<sup>32</sup>

In a sense, the whole process of embryonic development can be looked upon as a cooperative venture, jointly run by thousands of genes together. Embryos are put together by all the working genes in the developing organism, in collaboration with one another....We have a picture of teams of genes all evolving toward cooperative solutions to problems....It is the ‘team’ that evolves.<sup>33</sup>

Even in his signature book, *The Selfish Gene*, Dawkins conceded that genes are not really free and independent agents. “They collaborate and interact in inextricably complex ways...Building a leg is a multi-gene co-operative enterprise.” To underscore the point, Dawkins himself employed a metaphor from rowing. “One oarsman on his own cannot win the Oxford and Cambridge boat race. He needs eight colleagues... Rowing the boat is a co-operative venture.” Furthermore, Dawkins noted: “One of the qualities of a good oarsman is teamwork, the ability to fit in and co-operate with the rest of the crew.”<sup>34</sup>

What Dawkins is talking about here, of course, is group selection. Moreover, this form of group selection does not depend on altruism; it involves win-win relationships. Perhaps his book should have been called “The Cooperative Gene” — which is in fact the title of an article of mine published in 1996, as well as a recent book by biologist Mark Ridley.

Moreover, the cooperative gene model also fits the most likely scenario for human evolution, namely that we evolved from closely cooperating social groups; the context of human evolution most likely required close cooperation to offset the otherwise fatal vulnerabilities of these “Miocene midgets,” as Milford Wolpoff has dubbed them. (What I have called the “Synergistic Ape Scenario” is discussed in detail elsewhere.)<sup>35</sup>

## Reviving Spencer's Ethics

The other misconception, namely that evolutionary ethics must be based on altruism, can be addressed by returning to Spencer's vision. In effect, Spencer argued that an ethical system can be based on "prudential" grounds, or enlightened self-interest. Spencer's argument was hardly new, of course. It can be traced back at least to the Greek Stoics. Spencer's contribution was to relate enlightened self-interest to the biological problem of survival and reproduction and to assert that individual interests and the "public interest" were not necessarily incompatible or opposed to one another; they can be harmonized.

The crucial conceptual issue here was identified by Leslie Stephen in his rebuttal to Huxley's paradigm. If a society is viewed merely as an aggregate of individuals who have no common interests, and no stake in the social order, then why should they care? But if a society is viewed — more realistically in my view — as a complex, interdependent "collective survival enterprise," then each of us has a vital, life-and-death stake in its viability and effective functioning, whether we recognize it or not. Another way of putting it is that much of our public ethics, and the cultural institutions that we have evolved for encouraging — and enforcing — our ethical principles and rules, are also an expression of evolutionary ethics. The two are not radically different spheres.

Yet, in hindsight, Spencer's evolutionary ethics, while necessary, was also insufficient. Who, after the tragedy of 9/11, can doubt the reality of altruism as a significant aspect of human societies. We have grieved even for those we did not know and have donated billions of dollars to help their families. Moreover, there is much research showing that we do indeed seem to have an innate "moral sense." For instance, a sense of "fairness" seems to have a strong, if imperfect, pull on our preferences and our conduct, to the point that we may even be willing to make sacrifices on its behalf.<sup>36</sup>

How can this be? What adaptive advantage could a sense of fairness have bestowed on our remote Pleistocene ancestors, such that it was "blessed" by natural selection and incorporated into the undergarments of our evolving human nature? The most likely explanation, in a nutshell, is that the principle of fairness came to play a central role in reconciling conflicting interests within our ancestors' groups, bands, and tribes. Darwinian group selection was most likely a powerful supplement to Spencer's prudential economic calculus. To quote again Darwin's observation in *The Descent of Man*: "A selfish and contentious people cannot cohere, and without coherence nothing can be effected." Competition may be an engine for enterprise, and economic progress, but mutually beneficial cooperation is the fundamental organizing principle underlying all human societies. Indeed, there is mounting evidence that our sociality and readiness to cooperate far exceeds that of any other primate.<sup>37</sup>

## Tending to Huxley's Garden

If a guiding metaphor for evolutionary ethics might be useful, we probably can do no better than an improved version of the image that was introduced by T. H. Huxley in his Romanes lecture. Recall how Huxley suggested that a society can be likened to a domestic garden, where the task of the gardener (i.e., an ethical system) is to struggle with the hostile forces of nature to achieve an ordered regime and achieve the gardener's goals. John Dewey, in his rebuttal to Huxley, proposed a more benign image of the garden plot as a place where the gardener works *with* nature to make improvements and create conditions for abundant growth. From our vantage point, it seems likely that both versions of the garden metaphor are partly correct. Our ethical systems must, at one and the same

time, weed out the dandelions and fight the aphids and snails, while simultaneously planting, fertilizing, watering, pruning, and harvesting the plants upon which we have come to depend for our very sustenance.

So my answer to the leading question posed in this symposium is that, yes, the time is indeed ripe for evolutionary ethics — and has been, ever since Darwin. A better question is whether *we*, finally, are ripe for evolutionary ethics.

## References

.Among others, see especially Richard Alexander, *The Biology of Moral Systems* (New York: Aldine de Gruyter, 1987), Roger Masters and Margaret Gruter, eds., *The Sense of Justice* (Newbury Park, CA: Sage, 1992), Matthew and Doris Nitecki, eds., *Evolutionary Ethics* (New York: State University of New York Press, 1993), James Q. Wilson, *The Moral Sense* (New York: The Free Press, 1993), Paul Lawrence Farber, *The Temptations of Evolutionary Ethics* (Berkeley: The University of California Press, 1994), Robert Wright, *The Moral Animal* (New York: Pantheon, 1994), Frans de Waal, *Good Natured* (Cambridge, MA: Harvard University Press, 1996), Matt Ridley, *The Origins of Virtue* (New York: Viking, 1997), Elliott Sober and David Sloan Wilson, *Unto Others* (Cambridge, MA: Harvard University Press, 1998), Larry Arnhart, *Darwinian Natural Right* (Albany: SUNY Press, 1998), Leonard D. Katz, ed., *Evolutionary Origins of Morality* (Thorverton, UK: Imprint Academic, 2000), and Jane Maienschein and Michael Ruse, eds., *Biology and the Foundation of Ethics* (Cambridge, UK: Cambridge University Press, 1999). Recent volumes on religion include Stephen Jay Gould's *Rocks of Ages* (New York : Ballantine Publishing Group, 1999), Michael Ruse's *Can a Darwinian Be a Christian?* (Cambridge, UK: Cambridge University Press, 2001) and David Sloan Wilson's *Darwin's Cathedral* (Chicago: University of Chicago Press, 2002).

1. Charles R. Darwin, *The Descent of Man and Selection in Relation to Sex* (New York: A. L. Burt, 1871/1871). As the title suggests, the other half of this volume, the full title of which is seldom used, was devoted to Darwin's pioneering work on sexual selection.

1. Charles R. Darwin, *The Expression of the Emotions in Man and Animals* (Chicago: University of Chicago Press, 1873/1965).

2. On this issue Darwin differed sharply with his self-effacing co-discoverer, Alfred Russel Wallace. Wallace wished to exempt the human mind from the workings of natural selection, but Darwin obviously disagreed. See especially Henry L. McKinney, *Wallace and Natural Selection* (New Haven, CT: Yale University Press, 1972).

3. Charles R. Darwin, *The Descent of Man*, op. cit., 113-142.

4. Ibid., pp. 146-147. In another passage, Darwin speaks of an interplay between emotion and reason: "Although man, as he now exists, has few special instincts, having lost any which his early progenitors may have possessed, this is no reason why he should not have retained from an extremely remote period some degree of instinctive love and sympathy for his fellows. . . . Although man, as just remarked, has no special instincts to tell him how to aid his fellow-men, he still has the impulse, and with his improved intellectual faculties would naturally be much guided in this respect by reason and experience. Ibid., pp. 123-124.

5. Ibid., p. 148.

6. The history, and controversies, surrounding the use of this concept in biology, and elsewhere, are reviewed in Peter A. Corning, "Synergy and the Evolution of Superorganisms: Past, Present, and Future," 2002. Prepared for the annual meeting, Association for Politics and the Life Sciences, Montreal Canada, August 11-14. See also David Sloan Wilson and Elliott Sober, "Reviving the Superorganism," *Journal of Theoretical Biology*, 1989, 136: 337-56.

Bert Hölldobler and Edward O. Wilson, *Journey to the Ants* (Cambridge, MA: Belknap Press, 1994). Bert Hölldobler and Edward O. Wilson, *The Ants* (Cambridge, MA: Harvard University Press, 1990). Peter J. Richerson and Robert Boyd "Complex Societies: The Evolutionary Origins of a Crude Superorganism," *Human Nature*, 1999, 10: 253-289.

7. Herbert Spencer, *The Principles of Sociology* (New York: D. Appleton, 1874-5/1897), Vol. II, 1, p. 224.

8. In the conclusion to his overview chapter in *The Principles of Sociology*, Spencer penned a statement that is, to my mind, an underappreciated classic:

Recognizing the primary truth that social phenomena depend in part on the natures of the individuals and in part on the forces the individuals are subject to, we see that these two fundamentally distinct sets of factors, with which social changes commence, give origin to other sets as social changes advance. The pre-established environing influences, inorganic and organic, which are at first almost unalterable, become more and more altered by the actions of the evolving society. Simple growth of population brings into play fresh causes of transformation that are increasingly important. The influences which the society exerts on the nature of its units, and those which the units exert on the nature of the society, incessantly co-operate in creating new elements. As societies progress in size and structure, they work on one another, now by their war-struggles and now by their industrial intercourse, profound metamorphoses. And the ever-accumulating, ever-complicating super-organic products [it was Spencer, not the entomologist William Morton Wheeler, who coined the term "super-organism"], material and mental, constitute a further set of factors which become more and more influential causes of change. *Ibid.*, Vol. I, 1, pp. 14-15.

9. Herbert Spencer, *The Principles of Sociology* (New York: Appleton, 1874-5/1897), Vol. I, pp. 435-436.

10. Herbert Spencer, *The Principles of Ethics* (London: Williams and Norgate, 1892-93), Vol. I, p. 100.

11. Thomas Henry Huxley, "Evolution and Ethics" reprinted in *Evolutionary Ethics*, M. H. Nitecki and D. V. Nitecki, editors (Albany, NY: State University of New York Press, 1993), 50-70.

12. John Dewey, "Evolution and Ethics" reprinted in *Evolutionary Ethics*, M. H. Nitecki and D. V. Nitecki, editors (Albany, NY: State University of New York Press, 1993), pp. 95-110.

13. Leslie Stephen, "Ethics and the Struggle for Existence" reprinted in *Evolutionary Ethics*, M. H. Nitecki and D. V. Nitecki, editors (Albany, NY: State University of New York Press, 1993), pp. 81-94.

14. Edward B. Tylor, *Primitive Culture: Researches into the Development of Mythology, Philosophy, Religion, Art and Customs* (New York: Henry Holt, 1889[1871]), p. 7. See also Albert G. Keller, *Societal Evolution* (New Haven: Yale University Press, 1931[1915]). Also; William Graham Sumner, *Essays of William Graham Sumner* (New Haven: Yale University Press, 1934).

15. John D. Rockefeller quoted in Kenneth Lux, *Adam Smith's Mistake* (Boston: Shambhala, 1990), p. 148.

16. Andrew Carnegie, "Wealth," *North American Review*, 1889, reprinted in *The Andrew Carnegie Reader*, J. F. Wall, editor (Pittsburgh, PA: University of Pittsburgh Press, 1992), p. 132.

17. Pyotr Kropotkin, *Mutual Aid, A Factor of Evolution* (New York: McClure Phillips & Co., 1902), p. vi.

20. Julian S. Huxley and Thomas Henry Huxley, *Evolution and Ethics: 1893-1943* (London: The Pilot Press, 1947). Theodosius Dobzhansky, *The Biology of Ultimate Concern* (New York: New American Library, 1967). Theodosius Dobzhansky, "Ethics and Values in Biological and Cultural Evolution," *Zygon*, 1973a, 8 (3/4): 261-281. Theodosius Dobzhansky, "Is Genetic Diversity Compatible with Human Equality?" *Social Biology*, 1973b, 20: 280-

288.

21. Sewall Wright, *Evolution and the Genetics of Populations: A Treatise* (Chicago: University of Chicago Press, 1968-1978).
22. Ernst Mayr, *Animal Species and Evolution* (Cambridge, MA: Harvard University Press, 1963). Also Ernst Mayr, *Evolution and the Diversity of Life: Selected Essay* (Cambridge, MA: Harvard University Press, 1976).
23. William Morton Wheeler, *Emergent Evolution and the Social* (London: Kegan Paul, Trench, Trubner, 1927). Also, William Morton Wheeler, *The Insect Societies: Their Origin and Evolution* (London: Kegan Paul, Trench, Trubner, 1928). Also Warder C. Allee, *Animal Aggregations: A Study in General Sociology* (Chicago: University of Chicago Press, 1931). Also Warder C. Allee, *Cooperation Among Animals: With Human Implications* (New York: Henry Schuman, 1938/1951).
24. Vero C. Wynne-Edwards, "Intergroup Selection in the Evolution of Social Systems," *Nature*, 1963, 200:623. Also Vero C. Wynne-Edwards, *Animal Dispersion in Relation to Social Behaviour* (New York: Hafner, 1962). Some of Wynne-Edwards's critics, playing loose with the facts, accused him of a Pollyanna-like naivete that violated Darwinian theory, but in fact he clearly stated that altruistic, group-serving behaviors could arise only if natural selection were to operate between social groups "as evolutionary units." Notwithstanding this qualifier, Wynne-Edwards became a pariah in evolutionary biology and has been routinely chastised for his heresy ever since -- rather like the treatment accorded to Jean Baptiste de Lamarck for his theory regarding the inheritance of acquired characters.
25. William D. Hamilton, "The Genetical Evolution of Social Behavior, I," *Journal of Theoretical Biology*, 1964a, 7:1-16. William D. Hamilton, "The Genetical Evolution of Social Behavior, II," *Journal of Theoretical Biology*, 1964b, 7:17-52.
26. George C. Williams, *Adaptation and Natural Selection: A Critique of Some Current Evolutionary Thought*, (Princeton, NJ: Princeton University Press, 1966), p. 8; cf., George C. Williams, *Natural Selection, Domains, Levels and Challenges* (New York: Oxford University Press, 1992).
27. Richard Dawkins, *The Selfish Gene* (Oxford: Oxford University Press, 1976/1989), p. 2.
28. Helena Cronin, *The Ant and the Peacock* (New York: Cambridge University Press, 1991/1993), p. 327.
29. Robert Wright, *The Moral Animal: Evolutionary Psychology and Everyday Life* (New York: Pantheon, 1994), p. 186.
30. Peter A. Corning, *Holistic Darwinism: Synergy, Cybernetics and the Bioeconomics of Evolution* (Westport, Connecticut: Greenwood Press, in press).
31. John Maynard Smith and Eörs Szathmáry, *The Major Transitions in Evolution* (Oxford: W.H. Freeman Press, 1995), p. 261.
32. Richard Dawkins, *The Blind Watchmaker* (New York: W. W. Norton, 1986/1987), pp. 170, 171.
33. Ibid.
34. Richard Dawkins, *The Selfish Gene* (Oxford: Oxford University Press, 1976/1989), pp. 39-41.
35. Peter A. Corning, "The Co-operative Gene: On the Role of Synergy in Evolution," *Evolutionary Theory*, 1996, 11:183-207. Mark Ridley, *The Cooperative Gene: How Mendel's Demon Explains the Evolution of Complex*

*Beings* (New York: The Free Press, 2001).

36. Peter A. Corning, *Nature's Magic: Synergy in Evolution and the Fate of Humankind* (Cambridge: Cambridge University Press, 2003), Ch. 7. See also "Synergy Goes to War: An Evolutionary Theory of Collective Violence." Prepared for the annual meeting, Association for Politics and the Life Sciences, Charleston, S.C., October 18-21, 2001.

37. Peter A. Corning, "Fair Shares: Beyond Capitalism and Socialism (The Biological Basis of Social Justice)." Prepared for the annual meeting, Association for Politics and the Life Sciences, Montreal Canada, August 11-14, 2002.