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Ethics and Evolutionary Continuity: Comments on De Waal, Lyons, Moran, and Kraemer

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Coming to understand ourselves as existing in evolutionary continuity with the rest of the living world is critical to a reexamination of our relationship with the other animals. Frans de Waal's latest book is of great importance in contributing to the transfer of ethical behavior—in addition to tool use, “language” ability, “self-awareness,” and other such traits—out of the realm of supposed markers for “human uniqueness” and into the arena for examination as characteristics developed to differing degrees in many lifeforms through the process of natural selection. Identifying his work as a part of the growing, interdisciplinary field of cognitive ethology, de Waal makes no apologies for considering nonhuman animals as “knowing, wanting, and calculating beings.”¹ While a good Darwinist, he looks askance at the proclivity of proponents of “gene-centric sociobiology” to exploit the vernacular connotations of selfishness even as they speak technically of “selfish genes” and to emphasize competition, aggression and the negative aspects of animal behavior over cooperation, reconciliation and positive actions taken by individual animals, as noted by Lyons. Most of de Waal's work has been with captive primates, from his landmark study of the chimpanzee colony at the Arnhem Zoo in the Netherlands, documented in his earlier books *Chimpanzee Politics* and *Peacemaking in Primates*, to his observations of rhesus and stump-tailed macaques at the Wisconsin Primate Center and bonobos at the San Diego Zoo and his ongoing research at the Yerkes Primate Center in Atlanta. As one who has spent thousands of hours in face-to-face encounters with these nonhuman others, he has a lived awareness of and respect for their individuality in all its concreteness. This allows him to get beyond mere armchair abstraction and the insidious if inadvertent anthropocentrism of those who know no other than the human world. It also impels him to express concern about our treatment of nonhuman animals, both in captivity and in the wild. In *Good Natured*, de Waal makes a case for “the origins of ethics” in the behavior of nonhuman animals on the basis of his own and others' observations, as they can be fit within the paradigm of Darwinian thinking.

As de Waal discusses, ethological studies do show the existence of altruistic behavior—actions that benefit others at a cost to the individual performing them—in a multiplicity

of species, from ants that give their lives for their colonies to ravens that attack predators much larger than themselves to monkeys, dolphins, and elephants that treat the ill or disabled among them with special care. In order for such behavior to be sustained and propagated through natural selection, it must provide an advantage, either to the altruist over the long term, to his or her “selfish genes” in the form of benefits to the altruist’s kin, or both. Sociobiology emerged on the scene with Darwinian explanations for altruism, William Hamilton’s theory of kin *selection*² serving to make comprehensible, for example, the self-sacrificing behavior of sterile worker ants to further the survival of their closely related “sisters.” Kin selection will also go a long way in explaining, say, the nurturant behavior of vertebrate animals toward their young. De Waal and others theorize that, once such behaviors evolved, they may have become extended as succorant behavior, sympathy and perhaps even cognitive empathy manifested toward less related kin, mates, unrelated individuals of the same clan and others. A complementary theory, however, developed by Robert Trivers, recognizes the strategy of *reciprocal altruism*,³ whereby the altruist delivers a benefit to another at an immediate cost to herself, to be repaid at some time in the future. Such a strategy emphasizes long-term relationships between individuals and utilizes memory, emotion, and the spectrum of cognitive processes to be found especially among the birds and mammals. Those individuals who do not eventually reciprocate will be remembered and dealt with less altruistically in the future, to their own evolutionary disadvantage. In group-living species such as many of the primates, moreover, all members benefit from harmony and cooperation within the group. These facilitate both coordinated defense against predators and other groups and the maximal satisfaction of the interests of those within the group. This leads to the evolution of what de Waal terms *community concern*. Certain members of the group may mediate between conflicting parties. The reduction in aggressive behavior that their intervention achieves is to their own advantage as well as to that of others of the group. Similarly, actions that improve or threaten the quality of community life in various ways may receive reward or censure from all members of the community, leading to the development of reciprocal expectations, the internalization of social “rules” and the “punishment” of those who violate them. Out of such community concern, de Waal speculates, may have emerged the “social contract.”

Much of de Waal’s research has focused on reconciliation or “peacemaking” among the different primate species. In early observations of long-tailed macaques, supposedly a “belligerent” species, he observed that actual fighting occupied less than 5% of the group’s time.⁴ And in apes as well as monkeys, fights between individuals are usually followed by hugging, kissing, or other signs of mutual making-up between the former opponents, a fact he explains by emphasizing “the *worth* of relationships.”⁵ Social animals, particularly primates, have emotional bonds with one another, depend on each other’s mutual aid, and will act to preserve relationships, even or especially after conflicting interests cause aggression to flare. In seeing aggression as a natural part of social interactions and one for which primates have evolved coping mechanisms that are usually effective in preserving interindividual and group harmony, de Waal has an optimistic message for us humans: we are, in fact, basically “good natured,” born with capacities that, if allowed to develop, enable us not only to empathize with others, reciprocate benefit for benefit and internalize social rules for maintaining peace in the

community but also to resolve conflicts among individuals when they develop.⁶

In considering de Waal's views, Lyons and Moran (to different degrees) raise the question as to the extent to which nonhuman primates and other animals might be said to be cognizant of the effect of their behavior on others or to be acting with intention. Given that nonhuman animals are not linguistic beings in the sense that humans are, direct proof of or access to their mental states will always be denied us (as indeed, depending on the philosophical standpoint one takes, certainty about the existence of mental states in other human beings may be deemed impossible). This situation constitutes the central problematic of cognitive ethology and is frequently acknowledged in prefatory remarks of writings within the field.⁷ The common strategy seems to be adoption of "the intentional stance"⁸ as at least a useful heuristic for guiding future research if not one reflecting the actual state of affairs in the world. Quite a bit of evidence has been accumulated, however, in support of the view that some nonhuman animals not only have mental states of their own but may also be aware of the mental states of others. The apparent practice of deception has been abundantly documented in chimpanzees, for example—a practice de Waal defines as "the deliberate projection, to one's own advantage, of a false image of past behavior, knowledge, or intention."⁹ This would seem to require not only an awareness of one's own intentions but also a "theory of mind" regarding another's probable interpretation of one's actions.¹⁰ Ethologists, including the cognitive variety, remain observant of "Morgan's Canon"¹¹ in seeking the most parsimonious explanation of animal behavior in terms of "lower" mental capacities, wherever possible. As de Waal points out, however, there seem to be "two kinds of parsimony"¹² at work and in tension with one another in the interpretation of ethological studies, particularly where nonhuman primates are concerned. While we may rightly be cautioned against invoking complex cognitive skills to explain phenomena when simpler mechanisms will do, we also err in the direction of needlessly multiplying complexity if we assume different processes are at work in producing behavior that is similar in humans and in our close evolutionary relatives. De Waal identifies a principle of "evolutionary parsimony" to recognize the likelihood of common behavioral processes among species sharing a recent common ancestor.

There also seem to be "two kinds of" philosophical standpoints, in tension with one another, to be taken in commenting on de Waal. Following some criticisms of conflicting attempts to "read off" a system of ethics from evolutionary theory, Professor Lyons observes that, "[i]f we are biological beings and we accept an evolutionary account of our origins, then we must take morality quite seriously, and we must build it into our theories about human behavior." She identifies—correctly, I believe—de Waal's intent as similar to Darwin's, in "demonstrating how the moral sense could have evolved, rather than defining what was moral." Professor Moran, on the other hand, claims that an important question de Waal raises for philosophers is "does he establish that animals are moral?" Moran notes that, in order to answer *this* question, "we need to know what we mean by moral." Correctly, again, I would say, though I do not believe that answering this question is part of de Waal's project. From the first perspective, the one that seems to be taken by Lyons, the starting point is that we humans are biological beings, products of a long evolutionary process. It incorporates an assessment of ourselves "from the outside,"

as natural science sees us. The second perspective is generated strictly “from within” our human conceptual system. It is given that we have a concept of “what it means to be moral” (in need of clarification though it may be), and, armed with this concept, we can ask if nonhuman animals qualify as the kinds of beings it may be applied to. Are these two points of view reconcilable?

As one who has come to philosophy from the natural sciences, I must admit that I find the former standpoint by far the more comfortable. I also feel a strong desire (perhaps *qua* philosopher) to move the two into congruency, or at least have them mesh a little better than is frequently the case. How might the two perspectives engage in some mutual criticism? The former view does seem committed to the position that we can have knowledge (if fallible) of a (presumably) independently existing reality through the methods of contemporary science, including evolutionary theory, broadly construed. It is thereby always open to correction, and of course remains vulnerable to the gamut of skeptical doubt. On the basis of my direct conscious experience alone, I cannot be certain that a real world exists, nor that you do, for that matter (a consistent Cartesian must, I think, wind up not just in skepticism but in solipsism). Acknowledging fallibility and embracing the contingency and continual flux of all of nature, including human conceptual constructs, a proponent of the first view may cast a quizzical glance at one who, from the second perspective, purports to speak authoritatively about such things as “the essence of morality.” What is it that invests *our concepts*, in isolation from their developmental context, with such a timeless solidity?

De Waal tells us that he intends to “investigate the extent to which aspects of morality are recognizable in other animals.”¹³ His conclusion, following his investigation, is that there is much that they have in common with us in this regard. He maintains that characteristics that their lines and ours share with a common ancestor are likely to have “laid the groundwork for much that followed, including whatever we claim as uniquely ours.” He also makes use of a “tower metaphor” to compare the disregard of this evolutionary common ground with the fallacy of claiming that “the concept of ‘tower’ ought to be reserved for the summit” alone, in disregard of the rest of the building supporting it.¹⁴ Extending the metaphor further along the lines de Waal seems to have intended it, one who takes the first standpoint mentioned previously might see those adopting the second perspective as appearing very much like persons standing within the summit of a tower. They are looking out the windows and judge objects on the ground to be far below them and failing to “measure up” to their high standards. But they are unable to encompass their tower’s own foundation within their field of view.

One of de Waal’s points is the *flexibility* of primate, including human, behavior in the social realm. For example, following his discussion of the primate ability to maintain community harmony under conditions of crowding and other stresses, de Waal points to differences between the preferred cultural norms of relatively crowded societies such as Japan and the Netherlands (which praise conformity and tolerance) and those of less dense human populations (which may emphasize freedom and individuality). He maintains

Adjusting the definition of right and wrong is one of the most powerful tools at the disposal of *Homo sapiens*, a species of born adaptation artists. Morality is not the same during war and peace, or during times of plenty and scarcity, or under high or low population densities.¹⁵

In light of this passage, it should be clear that de Waal has no intention of endorsing a particular moral theory. To do so, in fact, would be tantamount to his identifying with the view out just one window of the tower of morality. Instead, he's considering all the different ways we have of laying bricks and mortar to form a turret. Similarly, if de Waal were charged with failing to appreciate *that there are necessary conditions* for the attribution of concepts such as empathy, sympathy or altruism, one would need to ask, "Well, what window are we looking out of?" *There are* necessary and sufficient conditions for making certain attributions to the extent that we humans choose to define things in a certain way, but our concepts are contingent, culturally specific, and imminently redefinable. There are not "necessary and sufficient conditions" existing in an ideal realm independent of us, merely to be discovered and employed. I think those who engage frequently in conceptual analysis sometimes forget this, just as those who dwell only within the top of de Waal's "tower" tend to overlook its base.

A second point that has been raised concerning de Waal's project is the matter of deciding whether or not a nonhuman animal can be taken to be a "subject of moral appraisal." I will assume that the issue here is one of moral agency, i.e., being able to carry out acts that are judged right or wrong and thus to receive blame or praise. Some have implied that "moral personhood" or being "a proper subject of moral appraisal" can be cashed out in terms of necessary and sufficient mental states and that de Waal should attempt to do so with respect to nonhuman animals. I think that this expectation is somewhat misguided. Ascribing intentions or mental states to nonhumans is, as discussed earlier, notoriously difficult, though de Waal and other cognitive ethologists welcome the challenge of attempting to do so through discriminating experimental design. To go beyond this demand, moreover, and inquire about how we may go on to ascribe "moral praise or blame" to nonhuman animals is, I think, tantamount to making a kind of category mistake. The primates de Waal considers do not live within our human system of morality, and while they may give indications of following their own sort of "moral rules," whether we might blame or praise their actions is not at issue. In his letter to the *New York Times* (August 22, 1996) about Binti, the gorilla that "saved" a boy who had fallen into the exhibit, de Waal concludes "her behavior goes a long way toward showing that compassion is a natural tendency in animals and—despite what some politicians have preached—in human societies." This claim is very much in agreement with the position he develops in his book. He says nothing, however, about "praising" her, nor would such an approach be a consistent one for him to take. In the first chapter of his book, in fact, de Waal asks

Can we really pass judgment on other animals any more than we can on the flow of a river or the movement of nuclear particles? ...Granted, animals may possess standards of behavior, perhaps even ethical standards. Yet [George] Williams [whom de Waal is taking to task for charging natural entities with "gross

immorality”] was not measuring their behavior against their own standards, but against those of the culture of which he happens to be a part.”¹⁶

While we may characterize the effect of her behavior and even hypothesize about her mental state in performing the action, ascribing moral praise or blame from within our own system of morality would not be a legitimate approach for us to take, in de Waal’s view. A different and probably more interesting question for him would concern the possible praiseworthiness of her act within her own gorilla society. Might her groupmates find her behavior “laudable” or “culpable” in any way, insofar as it served to promote or detract from the harmony of the group? De Waal provides a number of examples of behavior that might correspond to such attitudes within primate communities, such as the “punishment” meted out to the teenage chimpanzees who delayed the evening meal for their entire colony. Might they not have been “judged” to be the proper subjects of “blame” by the rest of the group?¹⁷ However, attempts on our part to pinpoint the “necessary and sufficient conditions” whereby such attributions were made by these youngsters’ conspecifics would, I suspect, be unlikely to succeed.

De Waal does, in a number of places throughout his book, speak of human morality and the central place of motives or intentions in *human* moral judgments. Indeed, he and Peter Singer offer remarkably similar hypotheses as to how social-life enhancing tendencies might have become explicit moral principles, though with somewhat different emphases on increasing awareness and the development of conceptual and linguistic abilities.¹⁸ Both also echo the thoughts of Charles Darwin before them. In *The Descent of Man*, Darwin traces the origin of our “moral sense” to the “social instincts” of group-living animals. He then observes that “after the power of language had been acquired and the wishes of the community could be expressed, the common opinion how each member ought to act for the public good, would naturally become in a paramount degree the guide to action.”¹⁹ Singer, in *The Expanding Circle: Ethics and Sociobiology*, gives an extended account that begins

Ethics starts with social animals prompted by their genes to help, and to refrain from injuring, selected other animals. On this base we must now superimpose the capacity to reason....

...Our language developed to the point at which it enabled us to refer to indefinitely many events, past, present, or future....We could reflect, and we could choose on the basis of our reflections. All this gave us, of course, tremendous advantages in the evolutionary competition for survival; but it also brought with it something which has not, so far as we can tell, occurred in any non-human society: the transformation of our evolved, genetically-based social practices into a system of rules and precepts guiding our conduct toward one another, supported by widely shared judgments of approval for those who do as the rules and precepts require, and disapproval for those who do not. Thus we arrived at a system of ethics or morality.²⁰

De Waal places less emphasis on the development of language *per se*, and probably would take issue with Singer’s implication that the ability “to reason” and to be guided

by rules and share judgments came into being when humanity crossed the linguistic threshold. But his account also moves from an evolutionary explanation of how “community concern” came to be propagated to the assessment that, *in humans*, it has its emerged into consciousness and been “made explicit”:

Community concern can be defined, then, as *the stake each individual has in promoting those characteristics of the community or group that increases the benefits derived from living in it by that individual and its kin*. This definition does not hinge on conscious motives and intentions; it merely postulates benefits associated with particular behavior....

...human morality can be looked at as community concern made explicit to the fullest degree. The higher a species’ level of social awareness, the more completely its members realize how events around them ricochet through the community until they land at their own doorstep....

...Our ancestors began to understand how to preserve peace and order—hence how to keep their group united against external threats—without sacrificing legitimate individual interests. They came to judge behavior that systematically undermined the social fabric as “wrong,” and behavior that made a community worthwhile to live in as “right.” Increasingly, they began to keep an eye on each other to make sure that their society functioned in the way they wanted it to function.

Conscious community concern is at the heart of human morality.²¹

De Waal does not attribute “*conscious* community concern” to nonhumans, as some have suggested, though it is quite likely that he would resist the claim that such consciousness is an “all or nothing phenomenon.” He does this in the case of empathy, for example. Is the presence or absence of such biologically based characteristics best determined by our attempting to decide whether or not nonhuman animals have satisfied some set of necessary and sufficient conditions, as our classical logic would insist? Or might such characteristics more profitably be considered in terms of, as Val Plumwood puts it, “a non-hierarchical concept of difference”²² that would recognize gradations along a continuum? Perhaps more discussion on this topic would be useful if we are to attempt to bring the first and second viewpoints that I outlined somewhat closer together.

Interestingly, Singer and de Waal also seem to agree that, with the evolution of the human sphere, “once reasoning has got started, it is hard to tell where it will stop.”²³ Singer points out that, while morality may have developed by serving to benefit just the members of an individual’s own group, “in the thought of reasoning beings, it takes on a logic of its own which leads to its extension beyond the bounds of the group.”²⁴ De Waal makes a case for sharing behavior having originated in the distribution of the occasional and highly prized vertebrate successfully hunted by our primate ancestors. He notes the irony of the elaboration of such within-group egalitarianism into the interspecies morality and vegetarianism espoused by Singer and others today, and he observes that “Moral reasoning follows a logic of its own, independent of how the human inclinations that it works with (or against) came into existence.”²⁵ He goes on to claim that “The moral philosopher simply takes for granted what the biologist seeks to explain.”²⁶ I would hope

that tomorrow's philosophers, more biologically informed, will take certain things less for granted and will continue to explore, with biologists and others, the directions in which a *conscious* "community concern" can lead us.

Finally, I would like to offer a few, brief comments on Professor Kraemer's paper, which leads us in a somewhat different, if less contentious, direction. First of all, I find it very interesting that Darwin should have, in his *Autobiography*, pointed to the existence of the abundance of pain and suffering in nonhuman animals and noted that it is not justifiable in the way that human suffering could be justified as a spur to "moral improvement." Its existence is, therefore, evidence against the existence of an omnipotent, omniscient and benevolent Creator. Since the Social Darwinists used their version of Darwin's thinking to argue against protective social policies, and since some of today's sociobiologists (and others) emphasize the harshness and "cruelty" of nature, it may come as a surprise to many that Darwin could have voiced such concerns, but these commonly made associations have been quite unfair to Charles Darwin. He was indeed sensitive to nonhuman suffering, and I would like to present the following passage, also from the discussion of "the moral sense" in *The Descent of Man*, in hopes that it may be more widely quoted when "good Darwinians" are found, as they sometimes are, disparaging the notion that animal pain is worthy of our notice:

Sympathy beyond the confines of man, that is, humanity to the lower animals, seems to be one of the latest moral acquisitions....This virtue, one of the noblest with which man is endowed, seems to arise incidentally from our sympathies becoming more tender and more widely diffused, until they are extended to all sentient beings. As soon as this virtue is honoured and practised by some few men, it spreads through instruction and example to the young, and eventually becomes incorporated in public opinion.²⁷

On the topic of Darwin's skeptical doubts, I would urge those interested to look into the growing field of evolutionary epistemology. Our thinking about knowledge can be "naturalized" just as our thinking about ethics can be. Henry Plotkin (though not a philosopher) has written a very accessible book in this field, *Darwin Machines and the Nature of Knowledge*.²⁸ He claims that knowledge ultimately is a matter of living and surviving, and as such "is a pervasive characteristic of all life." He maintains, rather poetically

[A]ll adaptations are knowledge. The fleshy water-conserving cactus stem constitutes a form of knowledge of the scarcity of water in the world of the cactus, and the elongated slender beak of the humming-bird is a manifestation of the knowledge of the structure of flowers from which the bird draws nectar.²⁹

Human knowledge may be less "partial and incomplete" than these forms of knowledge, but it has arisen from the same processes. As such, it is fallible and thus can't provide us with certainty. If certainty is what Darwin was after, then his own work demonstrates the impossibility of achieving this goal. I agree with Kraemer, however, that Darwin's doubts seem to have been about "grand conclusions" concerning God and the universe, not about

conclusions based on empirical evidence. His concern seems to echo that of Kant in the *Critique of Pure Reason*: we cannot claim knowledge about something that is completely inaccessible to experience. Interestingly, Plotkin speaks of “evolutionary Kantianism.” This position holds that Kant was correct that we come into the world with genetically based, *a priori* forms of knowledge but maintains that these “innate determiners” of knowledge “are *a priori* to us as individuals, but they have been gained *a posteriori* by the long evolutionary history of our species.”³⁰ Pretty neat contribution for a scientific viewpoint to make to a philosophical issue, I would say.

Lastly, while I am unable to enter into the theological debate over the “problem of evil,” I do feel impelled to play “devil’s advocate” and ask, now that we have a plausible and increasingly well-supported theory to explain the development and diversity of life on earth, why do we need to postulate a separate and human-like Creator? And why should we fear that, by not doing so, we will somehow undermine the value of life and threaten our own sense of worth? Why can’t we say, God is Life, God is biodiversity—and go on to treat Life with reverence? So the universe is selfcreating—is it not still a glorious manifestation, worthy of being regarded with a sense of awe? And, as part of it, are we not, also? True, we might be giving up a certain amount of comfort in the notion of there being a “personal” God, an omnipotent Being in human form who can intervene for us when called upon. But would we not be gaining tremendously in recovering a feeling of belonging and relatedness to all other life? Wouldn’t we gain a fuller appreciation of our responsibility as humans to choose our actions wisely? Last but not least, wouldn’t we gain the blessed relief of reducing our present level of cognitive dissonance about such matters? I was delighted when I finally came upon Daniel Dennett’s *Darwin’s Dangerous Idea* and found some of my own thoughts echoed within it. Dennett observes that “more than a century after Darwin’s death, we still have not come to terms with [his idea’s] mind-boggling implications.”³¹ That, to me, is the greatest challenge before philosophers today. In the final chapter, Dennett dares to ask “Is this Tree of Life a God one could worship?” and answers, “Probably not.” But he concludes, “I could not pray to it, but I can stand in affirmation of its magnificence. This world is sacred.”³² I can think of no better note on which to end.

Notes

¹ Frans de Waal, *Good Natured: The Origins of Right and Wrong in Humans and Other Animals* (Cambridge, MA: Harvard University Press, 1996), 3.

² For an overview of Hamilton’s thinking on kin selection, see, e.g., W. D. Hamilton, “Selection of Selfish and Altruistic Behavior,” in *Man and Beast: Comparative Social Behavior*, J. F. Eisenberg and W. S. Dillon, eds. (Washington, DC: Smithsonian Institution Press, 1971).

³ See R. L. Trivers, “The Evolution of Reciprocal Altruism,” *Quarterly Review of Biology* 46: 35-57.

⁴ *Ibid.*, 163-64.

⁵ *Ibid.*, 181.

⁶ De Waal offers some interesting conjectures about contemporary human societies along these lines. Unlike John Calhoun's rats, which under conditions of extreme crowding became consumed in a "behavioral sink" of violence and killing ("Population Density and Social Pathology," *Scientific American* 206 (1962): 139-148), primates seem to be able to withstand crowding with relatively little increase in aggressive behavior because, according to de Waal, they can "utilize countermeasures to keep their society from collapsing" (*Good Natured*, 198). Many monkeys and apes live together in small, face-to-face societies in which, although their compositions may change somewhat over time, all individuals are generally known to each other. This condition de Waal refers to as "the social cage." It is this network of relationships themselves that is the primary factor determining the level of aggression, not the crowding *per se*. He observes:

The picture emerging from this research is that of a close-knit social system that produces *x* conflicts and requires *y* reconciliations for its maintenance regardless of whether it is held together by a moat, a fence, dangerous predators, or hostile groups. The tighter the perimeter, the more work needs to be put into keeping tensions down, partly because it is harder to escape physical damage if they do erupt....

...All of these techniques [for defusing aggression] are part of the impressive adaptive potential of the primate order. (*Good Natured*, 200-201)

De Waal notes, however, that the anonymity of modern cities may breed a level of aggression and violence that "hardly fits the relational model, for it concerns people without ties"; "these massive collections of strangers have no parallel in the social life of monkeys and apes" (193). If "the social cage" has been shattered, will we be able to develop other techniques for recovering a measure of "community concern"?

⁷ For example, see Dorothy L. Cheney and Robert M. Seyfarth, *How Monkeys See the World* (Chicago and London: University of Chicago Press, 1990), 1-2; John Andrew Fisher, "The Myth of Anthropocentrism," in *Readings in Animal Cognition*, Marc Bekoff and Dale Jamieson, eds. (Cambridge, MA: The MIT Press, 1996), 13-15, and subsequent chapters in the same volume.

⁸ Attempting to explain or predict behavior by operating *as if* the behaving being acts on the basis of mental states or intentions. See Daniel Dennett, "Intentional Systems in Cognitive Ethology: The 'Panglossian paradigm' Defended" (*Behavioral and Brain Sciences* 6 (1983): 343-390 and *The Intentional Stance* (Cambridge, MA: Bradford Books, 1987).

⁹ *Good Natured*, 75.

¹⁰ See D. Premack and G. Woodruff, "Does the Chimpanzee Have a Theory of Mind?" *Behavioral and Brain Sciences* 1 (1978): 515-526, and R. W. Byrne and A. Whiten, *Machiavellian Intelligence: Social Expertise and the Evolution of Intellect in Monkeys, Apes, and Humans* (Oxford: Oxford University Press, 1988).

¹¹ "In no case may we interpret an action as the outcome of the exercise of a higher psychical faculty, if it can be interpreted as the outcome of the exercise of one which stands lower in the psychical scale," C. Lloyd Morgan, 1894. For a discussion, see Hugh

Wilder, "Interpretive Cognitive Ethology," in Bekoff and Jamieson, 33-39.

¹² *Good Natured*, 64.

¹³ *Ibid.*, 39.

¹⁴ *Ibid.*, 212.

¹⁵ *Ibid.*, 201.

¹⁶ *Ibid.*, 16.

¹⁷ *Ibid.*, 89.

¹⁸ See Peter Singer, *The Expanding Circle: Ethics and Sociobiology* (New York: New American Library, 1981).

¹⁹ Charles Darwin, *The Descent of Man*, in *The Origin of Species and The Descent of Man* (New York: The Modern Library, 1936), 472.

²⁰ *The Expanding Circle*, 91-92.

²¹ *Good Natured*, 207-208.

²² See Val Plumwood, *Feminism and the Mastery of Nature* (London and New York: Routledge, 1993), 55-59.

²³ *The Expanding Circle*, 114.

²⁴ *Ibid.*

²⁵ *Good Natured*, 146.

²⁶ *Ibid.*

²⁷ *The Descent of Man*, 492.

²⁸ Henry Plotkin, *Darwin Machines and the Nature of Knowledge* (Cambridge, MA: Harvard University Press, 1993).

²⁹ *Ibid.*, 228.

³⁰ *Ibid.*, 241.

³¹ Daniel C. Dennett, *Darwin's Dangerous Idea* (New York: Simon & Schuster, 1995), 19.

³² *Ibid.*, 520.