Darwin on the Treatment of Animals: His Thoughts Then and His Influence Now

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ABSTRACT

Charles Darwin's theory of evolution has seriously challenged traditional religious views on the origins of life, as well as on our human-animal similarities. Darwin is often referenced in literature on animal ethics with regard to his contention that the difference between humans and other animals is one of degree rather than of kind. This paper posits that Darwin's writings and theory make more positive contributions to the contemporary debate on animal ethics than for which he has previously been given credit. This paper addresses important aspects of Darwin's theory for understanding our relationship with other animals and the implications for their subsequent treatment. First, this paper considers themes in Darwin's original writings regarding relationships among different species; second, enhancements to his theory in support of these themes; and third, recommendations for how these themes can and should inform our moral reasoning and successive treatment of other animals.

Keywords: Charles Darwin, Evolution, Animal Rights, Animal Ethics, Theory of Evolution

Introduction

Charles Darwin is one of the most significant thinkers of the Western World, and certainly in the last 200 years. His theory of evolution, now the prevailing paradigm in biology for the explanation of how life began and perpetuates itself, shook the theological world in terms of its challenges to the biblical account of creation, the notion of dominion, and the fixity of species. Darwin's oft-quoted phrase that the difference between humans and other animals is one of degree and not of kind represents a fundamental challenge to the way that we think about other animals, and certainly has implications for the way that we treat them. In fact, in many ways we can even credit Darwin with the notion that humans too are animals. In this paper, we will attempt to explore the implications of Darwin's theory and the modifications of his theory since the advent of genetics. We will also make the argument that his writings and the re-conceptualization of evolutionary theory can help forge a stronger foundation for the ethical treatment of animals.

In the first section, we explore the major works of Darwin to see what he had to say about the natural world and the close relationship between humans and other animals. These works include *Voyage of the Beagle*, *Origins of Species, Expression of Emotions in Man and Animals*, *The Life and Letters of Charles Darwin (3 vols.)*, *Autobiography*, and *The Descent of Man*. In the second section, we will briefly describe modifications to this theory that followed additional scientific discoveries. These discoveries in light of Darwin's theory emphasize our human-animal relationship, and recent advances in epigenetics and the role of culture in evolution reinforce that relationship. In the third and final section we will offer specific ways in which these observations should inform our dialogue concerning the ethical treatment of animals.[1]

Darwin's Works

Darwin's development as a naturalist was circuitous. His father was a physician who desired that Darwin follow in his footsteps by studying medicine, and when he was not interested in that, his father (who had a strong influence over him) encouraged him to become a clergyman. Through a lucky twist of fate, Darwin was able to travel for five years as special guest of Capt. Fitzroy as naturalist on board the Beagle as it circumnavigated the

[1] For a more detailed, as well as philosophical treatment of this subject, see James Rachels, *Created from Animals: The Moral Implications of Darwinism* (Oxford and New York: Oxford University Press, 1990).

globe. Darwin lived in an era where specializations, even in science, were not as narrow as they are today, so he embodied in his work that of a naturalist, geologist, zoologist, paleontologist, and of course, biologist – in particular botany and entomology. His family money enabled him to fund this travel, as well as the rest of life's work which was devoted to further developing, refining, and writing about his experiences and subsequent theory, that ultimately began on the Beagle.

The books drawn upon for this article do not represent all of Darwin's work, but each of the following works were thoroughly examined for his views on the relationship between humans and other animals. The *Voyage of the Beagle* includes Darwin's speculations on the reasons for differences among species in various geographical locations. *On the Origin of Species*, written approximately 20 years later, provides an overview of Darwin's theory of evolution. In *The Descent of Man*, he examines the origins of humans in light of his theory. In *The Expression of Emotions in Man and Animals* Darwin analyzes behavior and emotional expression, drawing similarities between humans and other animals. In his short *Autobiography,* Darwin tells the story of his life in terms of important relationships and highlights in his scientific journey. *The Life and Letters of Charles Darwin*, edited by his son Francis, focuses in particular on correspondence with other scientists. Darwin's ideas on the relationship between humans and other animals certainly developed over time, but it is fair to say that his views tended to be quite consistent with regard to the difference being one of degree rather than kind (this view is considered as part of the section dealing with enhancements to his theory). In the paragraphs that follow, themes and quotes are used to illustrate Darwin's personal views, both negative and positive, regarding the relationship between humans and other animals.

Negative Contributions

Before exploring how Darwin's ideas can help us with regard to a more ethical treatment of animals, we have to see where Darwin is not much help. Darwin's writings clearly indicate that while he collected, experiment, and hunted animals, his words often include reflection on the appropriateness of these actions. Darwin was a passionate collector of animal (and plant) specimens, even before he was a scientist. In fact, in a letter in 1869, he said: "Certainly collecting is the best sport in the world" (Darwin, 1887, Vol. 3, p.114). As a boy, he loved to collect insects, especially beetles, although he did not always feel the need to kill them. On the voyage of the Beagle, he collected many specimens. As just one example, he said, "During our stay at Maldonado I collected several quadrupeds, eighty kinds of birds, and many reptiles, including nine species of snakes" (Darwin, 1845, p. 56). References to animal collecting pepper the pages of *The Voyage of the Beagle*. Obviously, most of these animals had to be killed, but certainly not all. As part of his scientific study, he engaged in animal experimentation, although he thought that it should not cause significant harm without very good reason. He even killed animals in order to examine their food habits: "I found in the stomachs of two [birds] which I opened the remains of mice, and I one day saw a small snake killed and carried away" (Darwin, 1845, p. 131).

As a teenager, he enjoyed hunting and continued this into early adulthood. Even on the Beagle he hunted: "Our day's sport, besides the monkey, was confined to sundry small green parrots and a few toucans" (p. 37).Darwin enjoyed hunting, but later in life came to see it as a feature of barbarian rather than civilized culture: "I discovered though unconsciously and insensibly, that the pleasure of observing and reasoning was a much higher one than that of skill and sport…"(Barlow, 1958, p. 66).He did seem to have mixed feelings about hunting: "How I did enjoy shooting, but I think that I must have been half-consciously ashamed for my zeal, for I tried to persuade myself that shooting was almost an intellectual enjoyment…" (p. 47).He liked to fish but was careful as to how he utilized worms for this purpose (p. 26).He ate meat, including tortoises, on his Beagle voyage.

Darwin's views on collecting and the hunting of animals certainly developed over time, but his views tended to be quite consistent with regard to the difference being one of degree rather than kind. While he considered humans and animals to have many cognitive abilities in common, he still considered human mental powers to be superior to animals – he did sometimes refer to some animals as "lower animals." He even states his view quite explicitly in his last work, *The Descent of Man*:

> "Man in the rudest state in which he now exists is the most dominant animal that has ever appeared on this earth. He has spread more widely than any other highly organized form: and all others have yielded before him. He manifestly owes this immense superiority to his intellectual faculties, to his social habits, which lead him to aid and defend his fellows, and to his corporal structure. (Darwin, 1874, p. 49)"

And yet he still maintained shortly afterwards, that "My object in this chapter [ch. III – Mental Powers] is to show that there is no fundamental difference between man and the higher mammals in their mental faculties" (Darwin, 1874, p. 67). In many ways Darwin was a product of his time, but the development of his thinking demonstrated that he was unafraid to modify his views if the facts – or even his conscience – pointed elsewhere.

Positive Contributions

Darwin's writings illustrate his appreciation for the natural world and his compassion for animal suffering. He wrote: "Delight itself, however, is a weak term to express the feelings of a naturalist who, for the first time, has wandered by himself in a Brazilian forest" (Darwin, 1845, p. 21). Although later in life he was unwilling to believe in a personal God who designed the world, he still often experienced awe in its presence. He expressed pity for the suffering of animals in general, and was particularly troubled by the problem of evil. In a section where Darwin justified the non-existence of a personal God due to this suffering, he wrote:

> "That there is much suffering in the world no one disputes. Some have attempted to this in reference to man by imagining that it serves for his moral improvement. But the number of men in the world are as nothing compared with that of all other sentient beings, and these often suffer greatly without any moral improvement…for what advantage can there be in the sufferings of millions of the lower animals throughout almost endless time? (Barlow, 1958, p. 75)"

He also felt compassion for the suffering of individual animals. In the *Voyage of the Beagle*, he tells this brief story about horseback riding:

> "One day, riding in the Pampas with a very respectable 'estanciero,' my horse, being tired, lagged behind. The man often shouted to me to spur him. When I remonstrated that it was a pity, for the horse was quite exhausted, he cried out, 'Why not? – never mind – spur him – it is *my* horse.' I had then some difficulty in making him comprehend that it was for the horse's sake, and not on his account, that I did not choose to use my spurs. (Darwin, 1845, p. 157)"

Even as a boy, he recognized that while at times animals might need to be harmed, it should not be more than necessary: "I was very fond of collecting eggs but I never took more than a single egg out of a bird's nest, except on one single occasion, when I took all, not for their value, but from a sort of bravado" (Barlow, 1958, p. 25). He admitted once killing a puppy as a boy but expressed sincere regret over it later: "…I acted cruelly, for I beat a puppy I believe, simply from enjoying the sense of power…This act lay heavily on my conscience…" (p. 26). He was reluctant even to harm insects as a boy: "I almost made up my mind to begin collecting all the insects which I could find dead, for on consulting my sister, I concluded that it was not right to kill insects for the sake of making a collection" (p. 40). As a scientist, he did have qualms about certain kinds of animal experimentation; in a response in a letter to a question about vivisection, he wrote:

> "I quite agree that it is justifiable for real investigations on physiology; but not for mere damnable and detestable curiosity. It is a subject which makes me sick with horror, so I will not say another word about it, else I shall not sleep to-night (Darwin, 1887, Vol. 3, p. 200). "

In fact, he worked to try and get legislation passed which would curb some of the abuses of experimentation in his day (p. 205).

Connection between Humans and other Animals

Darwin's writings demonstrate his view that the many of the physical, emotional, and behavioral differences between humans and other animals is one of degree rather than kind. Darwin believed in the concept of descent with modification – that all species derive from a single common parent, and that the meanderings through the tree of life over time demonstrate that humans and other animals share a common ancestor:

> "The community of certain expressions in distinct though allied species, as in the movements of the same facial muscles during laughter by man and by various monkeys, is rendered somewhat more intelligible, if we believe in their descent from a common progenitor. He who admits on general grounds that the structure and habits of all creatures have been gradually evolved, will look at the whole subject of Expression in a new and interesting light. (Darwin, 1872, p. 11)"

He stated a primary thesis of his theory as follows:

> "Nevertheless all living things have much in common in their chemical composition, their germinal vesicles, their cellular structure, and their laws of growth and reproduction…Therefore I should infer from analogy that probably all the organic beings which have ever lived on this earth have descended from someone primordial form, into which life was first breathed. (Darwin, 1859, p. 303)"

The behaviors that he observed in animals led him to the conclusion that there was a strong correlation which included similarities in emotions, instincts, communication, and reasoning. In *The Expression of Emotions in Man and Animals*, his comparison of these expressions in behavioral and facial features demonstrate remarkable similarities in sounds, gestures, responses to danger, sexual selection, communication, position of different body parts, etc. He explored a multitude of emotions, including grief, anxiety, despair, devotion, tender feelings, ill-temper, anger, surprise, fear, and many more – and in virtually all cases, Darwin studied these in both humans and other animals. Darwin believed that other animals experience emotions, and uses the same words for emotions that are utilized in reference to humans, without qualification. He believed that insects have emotions: "Even insects express anger, terror, jealousy, and love by their stridulation" (Darwin, 1872, p. 108). In particular, he believed apes and humans to be quite similar, even in terms of language:

> "Man not only uses inarticulate cries, gestures, and expressions, but has invented articulate language; if, indeed, the word *invented* can be applied to a process, completed by innumerable steps, half-consciously made. Any one who has watched monkeys will not doubt that they perfectly understand each other's gestures and expression, and to a large extent, as Renggerasserts, those of man. (p. 36)"

He noted:

> "The appearance of dejection in young orangs and chimpanzees, when out of health, is as plain and almost as pathetic as in the case of our children. This state of mind and body is shown by their listless movements, fallen countenances, dull eyes, and changed complexion. (p. 74)"

In fact, he provides a quote of Huxley with which he obviously agreed – that humans are closer to apes than apes are to dogs (Darwin, 1874, p. 11). He even accepted virtually as a given that animals can reason:

> "Only a few persons now dispute that animals possess some power of reasoning. Animals may constantly be seen to pause, deliberate, and resolve. It is a significant fact, that the more the habits of any particular animal are studied by a naturalist, the more he attributes to reason and the less to unlearnt instincts (p. 77). "

He did acknowledge, though, that we cannot with certainty know what passes through another animal's mind. Central to Darwin's theory is his view that "…we should always look for forms intermediate between each species and a common but unknown progenitor; and the progenitor will generally have differed in some respects from all its modified descendants" (Darwin, 1859, p. 177). For Darwin, this applies to the evolution of the human animal. He made his argument by exploring all the different aspects of lifein which there is similarity: bodily structure, diseases, normal processes, reproduction, embryonic development, presence of rudimentary organs, etc. (Darwin, 1874, pp. 5-26).But Darwin frequently reminded himself and his readers of our own ignorance with regard to other animals: "We need not marvel at extinction; if we must marvel, let it be at our presumption in imagining for a moment that we understand the many complex contingencies, on which the existence of each species depends" (Darwin, 1859, p. 202). All in all, in spite of some of the inconsistencies in Darwin's ideas with regard to other animals, he consistently maintained that we share a common ancestor, a common structure, and common behaviors and emotions.

Further Developments of Darwin's Theory

We have considered how Darwin's original writings inform the relationships among different species, but his "original synthesis" continues today to provide a theoretical framework for biologists in their efforts to enhance our understanding of our relationships with animals. Two enhanced views of evolutionary theory are considered here. The first is the "modern synthesis" of evolutionary theory which relies heavily on modern genetics as a mechanism to explain evolutionary processes with DNA as the fundamental unit for the inheritance of variation and change. This modern synthesis supports Darwin's view that when it comes to our relationship with other animals, it is matter of degree, not kind. Darwin's theory and its modifications confirm the fact that we are one animal species among many, and that we share a common ancestry with all forms of life. The second enhancement to Darwin's theory is a "post-modern synthesis." This view (not entirely popular among biologists) is emerging and considers factors over and above DNA's role in evolutionary theory, including culture and social interactions as additional drivers in the evolution of our species.

The "Modern Synthesis"

Molecular biology provides an explanatory mechanism for Darwin's theory; the process of natural selection acts on variations in DNA sequences to mold new forms of life. This perspective provides very powerful information to support Darwin's view that humans are animals and that the differences among animal species is a matter of degree. Biologists define two species as distinct (a difference of kind) when the one species can no longer mate and produce viable offspring with the other species, but the two species may still be very similar and share an extensive amount of genetic information as descendants from a common ancestor (a difference of degree).

We begin here by describing the modern synthesis in light of Darwin's original synthesis. Darwin was not alone in his efforts to illustrate the evolution of life on Earth (in fact he was almost scooped by Alfred Russell Wallace), but Darwin's thorough analysis with extensive observations in support of his theory set forth an essential framework that ultimately proved consistent with modern scientific findings. To illustrate, consider the following lines taken from Darwin's concluding paragraph in *The Origin of Species by Natural Selection* (numbers have been added for subsequent discussion):

> "It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being [1] Growth with Reproduction; Inheritance which is almost implied by reproduction; [2] Variability from the indirect and direct action of the external conditions of life, and from use and disuse; [3] a Ratio of Increase so high as to lead to a Struggle for Life, and as a consequence to [4] Natural Selection, entailing Divergence of Character and the Extinction of less-improved forms. Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. (Darwin, 1859, p. 307)"

Darwin's genius was his ability to generate these general laws (in part, 1 through 4 above) from a vast array of field observations and the works of others. This theory remains viable in light of current modern scientific observations. Modern genetic science has identified nucleic acids (primarily DNA) as essential molecules for the transmission of information from generation to generation, and for the controlled synthesis and function of organisms (see 1 above). DNA is a relatively stable chemical, but it is also capable of variation. Changes in DNA (primarily random mutations) and sexual reproduction are important sources of variability among organisms within a population (see 2 above). Competition for resources increases as populations increase in number over time (see 3 above). This variability serves as raw material on which natural selection acts to yield new varieties and species, each from a common ancestor and fine-tuned over time to exploit a niche (see 4 above).

The modern synthesis via molecular genetics has provided overwhelming material evidence that we are of, not apart from, animals and the web of life on Earth. The genetic code is universal among all living organisms and we, as do all other animals, share in the prodigious information that codes for all life on Earth. Genes comprising all extant species have common ancestry, and we share in that ancestry. To illustrate this point, we briefly describe the code and some evidence. The genetic code is written in "biochemical letters" (these are nucleotide bases represented by the letters A, C, G, and T in DNA; U replaces T in RNA). These chemical letters are arranged in groups of three (these triplets in specific sequences form genes), which can as needed be transcribed by a cell into RNA for subsequent translation into protein. Coded information to build proteins and ultimately the entire organism is called the organism's "genome." The National Center for Biotechnology Information (NCBI, 2012) is an extensive repository for genomic information and contains coding sequences for more than one thousand organisms including microbes, plants, and animals. The fact that this database contains a multitude of coded sequences that we share with other organisms is overwhelming evidence in support of our kinship with all living beings. Related genes in humans and apes are about 95 to 98 percent similar, but it may be a surprise to learn that related genes among humans and mice are on average 85 percent similar (DOE, 2012). Using DNA as a tool to accurately assess evolutionary relationships among organisms is ongoing. The NCBI (2012) is building a *HomoloGene* database to illustrate the number of homologous DNA sequences (indicative of common ancestry) among sequenced genomes. For example, consider the number of HomoloGene groups observed in the following organisms: 18,631 in humans; 17,945 in chimpanzees; 19,027 in house mice; 13,150 in domestic chickens; 7,508 in mosquitos; and 779 in a protozoan that causes malaria. Humans, chimpanzees, and even mice, share large numbers of DNA sequences. Many of these sequences are also found in our more distant ancestors such as chickens, mosquitos, and even protozoa; this is strong evidence that we may be more related to other forms of

life than we anticipated. The *HomoloGene* database is growing, and so is a realization that we may share genetic information with nearly all life on Earth.

Research suggests that the sumtotal of genetic information (shared and species-specific) may have evolved to orchestrate the complex web of life on Earth, and our existence as biological animals depends on this web of life. In a paper presented to the American Society of Naturalists, Society President John N. Thomson (2009) stated the following regarding coevolution and genomes: "Multicellular species have a nuclear genome that is incomplete for survival and reproduction, because natural selection over billions of years has favored individuals that use the genomes of other species for many functions" (p.134). One example is the fact that humans need intestinal bacteria for healthy digestion. The Human Microbiome Project (NIH, 2012) is an ongoing effort by scientists to identify organisms that live on and within the healthy human body. Countless microorganisms, some of them unique to each of us, form micro-ecosystems with our cells and bio-systems. Clearly, we are one animal species among many, and our very survival depends on this relationship.

"Post-Modern Synthesis"

Random variations in sequences of DNA are fundamental to modern illustrations of how evolution operates, but molecular biologists are gaining new insights into biochemical factors that control the expression of DNA sequences (this field of study is called "epigenetics"). Generally speaking, all cells in a particular multi-celled organism have the same DNA, but biochemical factors may control gene expression (without altering the DNA sequence) for cellular specialization and the development of organ systems. Both genetics and epigenetics fall within the modern view of evolutionary theory, but the extent to which epigenetic factors play a role in evolution by altering the expression of genes in future generations is much more difficult for biologists to explain. *Nature via Nurture* by Matt Ridley (2003) is an example of the dialogue surrounding efforts to explain how human genes and environmental factors interact. The post-modern synthesis takes this consideration to the next level as biologists examine environmental factors above and beyond the gene level that may alter the course of evolution. This challenge did not deter Eva Jablonka and Marion J. Lamb (2006) when they published *Evolution in Four Dimensions: Genetic, Epigenetic, Behavioral, and Symbolic Variation in the History of Life.* They call for a bold and different way of looking at the evolutionary process. They agree that the inheritance of both genetic and epigenetic information plays a role in evolution (compatible with the modern synthesis), but they argue that it is now time to also seriously consider both the behavioral transmission of information in animals, and the symbolic transmission of information in humans, as legitimate factors in the evolutionary process (a post-modern synthesis).

Jablonka and Lamb do not disregard the modern synthesis, but they challenge the notion that it is a purely random process. Animal behavior and symbolic information systems are additional factors in evolution, and they suggest that these factors change environments—these factors can operate in a cycle of interactions with genetic and epigenetic systems of inheritance to alter the course of evolution. This is most obvious when considered in light of human cultures, but Jablonka and Lamb recognize the development of culture as a possibility for animals. In their words:

> "Nonhuman animals transmit behavioral information in a variety of ways: often it is through vocal signs, as in the communication systems of birds and whales; in other cases it may involve a complex combination of vocal, visual, tactile, and olfactory signs. When communicated across generations, these animal signs may form a culture. (p. 205)."

Jablonka and Lamb argue that what sets us apart from animals is our species' ability to process and transmit symbols, and that both genes and symbols carry latent information that can skip generations. The transmission of culture requires biological structures that support learning to facilitate the transmission of behaviors. The rapid explosion in human evolution (the ability to create our own niches and influence our own evolution) may be a result of biological systems that have evolved to support symbolic communication. Jablonka and Lamb prefer "symbolic" over "memetic" transfer. Memes are replicating units of culture (Dawkins, 2006) and are best understood in light of genetic models. In contrast, symbols according to Jablonka and Lamb are more holistic and consistent with a post-modern view of Darwin's theory; behavioral and symbolic information systems in a cycle of interaction with genetic and epigenetic systems may alter the course of evolution. It remains an open question whether or not processing and transmitting symbolic information is limited to humans. If cultural and social interactions do distinguish us among species, we should at least be able to recognize a right relationship with animals and our environment, and not succumb to purposeless evolutionary forces and speciesism.

Implications of Darwin's Influence on Ethical Treatment of Animals

It is clear that both Darwin's original works as well as modifications to his theory provide significant support for a more humane treatment of other animals. Darwin's ideas have very practical implications. Even what are considered some of his problematic practices and views can remind us that virtually none of us are "innocent" when it comes to our treatment of animals. This can add a dose of humility to the animal movement, and should help us to be less defensive when others challenge our recommendations by pointing out our own inconsistencies with regard to their treatment. We can point out that we are "in process" and that we all have a long way to go. Of course, like Darwin, we should listen to our consciences, and let that be our ultimate guide. Darwin's greatest contribution is the idea of the close similarities that we share with all species – with regard to the physical features that Darwin could observe, as well as with the technology of modern science which enables us to understand that these similarities are at the level of DNA and genes. Modern science especially supports the idea that our relationship is even closer than Darwin could have proven. In fact, we could legitimately make the argument that other animals are our "relatives," and this understanding could foster more inquiry into kinship theory and the implications that this has for our moral behavior towards animals. Darwin emphasized our common ancestry, and this also is supported by modern science. This idea challenges the kind of false dichotomies and dualisms that we humans like to create with regard to other species. While one does not necessarily have to reject all of one's religious ideas to support the theory of evolution, Darwin and his descendants certainly have demonstrated the significance of science as an ally, rather than an enemy, in exploring the natural world. Darwin's theory in all its forms challenges the notion of a fixed species boundary; science demonstrates that this is much more fluid than some of us might like to think. Darwin's understanding of animal emotions and other mental states certainly provides strong fodder against the continued arguments that animals are different from us in significant enough ways that we can use them for food, experiment on them, etc. While Darwin acknowledged some human superiority, such as with regard to reason or morality, it certainly is not as great as some of us would like to believe. Modern science even challenges the idea that only humans have culture. Darwin supports many intuitions that people, especially children, have about not harming animals, particularly young animals. Modern science especially reminds us of the intricate intertwining of the fate of humans with the fate of other animals. There is a complicated web of life, of which we are simply a part, and our environmental ethic should reflect that what affects one species affects all species. Darwin and modern science especially demonstrate the close relationship between humans and other primates, and this can assist with movements such as the Great Ape Project. But of course, Darwin's work elevates the status of all animals. However, any superiority that we might have puts the burden on us to protect other species when within our control. Though nature is "red in tooth and claw," certainly we do not need to contribute to the significant suffering and death that already exists in the natural world.

Most importantly, Darwin's legacy reminds us of the power of the written word to change the world; his books, but especially *On the Origin of Species*, started a paradigm shift in science within which we are still operating. Darwin's theory came to be accepted by many people because of his ability to present a convincing case for his ideas, similar to Peter Singer's (1975) classic book, *Animal Liberation*, and its profound effect on the animal "rights" movement. These are helpful reminders to those of us, especially academics, to continue to present our ideas in writing. Academic life and certain other professions provide the kind of time that is needed for reflection on ideas, especially new ideas, of which we cannot assume that all humans are capable. But with this time comes great responsibility, certainly to our fellow creatures, with who we share so much. Darwin reminds us of our ignorance with regard to the minds of other animals, which can perhaps help us to err on the side of caution rather than hubris in our attitude towards and treatment of other animals. Finally, Darwin's work reminds us of the importance to continually be open to new ideas, especially as evidence is provided. He stated:

> "As far as I can judge, I am not apt to follow blindly the lead of other men. I have steadily endeavored to keep my mind free, so as to give up any hypothesis, however much beloved (and I cannot resist forming one on every subject), as soon as facts are shown to be opposed to it.(Barlow, 1958, p.115)"

This should be something for which we all strive, and which we continually remind others to strive for. No doubt science will continue to open up new horizons with regard to our understanding of other animals, and the writing on the wall suggests that more evidence will be forthcoming regarding our deep relatedness. Let us embrace, rather than fear, what we might discover, and celebrate it as another step in our continued co-evolution with other species.

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