ANIMAL PASSIONS AND BEASTLY VIRTUES: COGNITIVE ETHOLOGY AS THE UNIFYING SCIENCE FOR UNDERSTANDING THE SUBJECTIVE, EMOTIONAL, EMPATHIC, AND MORAL LIVES OF ANIMALS

by Marc Bekoff

Abstract. In this essay, my response to four papers that were presented at the 2004 annual meeting of the American Academy of Religion in a session devoted to my research on animal behavior and cognitive ethology, I stress the importance of interdisciplinary research and collaboration for coming to terms with various aspects of animal behavior and animal cognition. I argue that we have much to learn from other animals concerning a set of "big" questions including who we are in the grand scheme of things, the role science ("science sense") plays in our understanding of the world in which we live, what it means to "know" something, what some other ways of knowing are and how they compare to what we call "science," and the use of anecdotes and anthropomorphism to inform studies of animal behavior. I ask, Are other minds really all that private and inaccessible? Can a nonhuman animal be called a person? What does the future hold if we continue to dismantle the only planet we live on and persecute the other animal beings with whom we are supposed to coexist? I argue that cognitive ethology is the unifying science for understanding the subjective, emotional, empathic, and moral lives of animals, because it is essential to know what animals do, think, and feel as they go about their daily routines in the company of their friends and when they are alone. It is also important to learn why both the similarities and differences between humans and other animals have evolved. The more we come to understand other animals, the more we will appreciate them as the amazing beings they are, and the more we will come to understand ourselves.

Keywords: animal behavior; animal cognition; animal emotions; animal sentience; cognitive ethology; ethology.

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Animals Are "In"

> Sperm whale culture . . . might encompass abstract concepts, perhaps even religion. (Whitehead 2003, 371)

> It also struck me that a great deal of the concern people felt about having an inherent nature that might be comparable to animal nature was based on a misunderstanding of how animals actually behaved. . . . The reality was that animals behaved in a far less crude fashion . . . by misjudging animals they misjudged themselves. (Mary Midgley, in Crace 2005)

> There is more to life than basic scientific knowledge. (Papineau 2005, 803)

> There's a certain tragic isolation in believing that humans stand apart in every way from the creatures that surround them, that the rest of creation was shaped exclusively for our use. (*New York Times* 2005)

Let's face it, animals are "in." Whenever I go to a meeting where I'm the "animal guy" who's supposed to tell people about the latest and greatest information about animal intelligence and animal emotions, discussions invariably slide toward people wanting to know more about the animals with whom they live or the animals whose lives they are influencing. Even when I speak at meetings where environmental matters and land use are foremost, talk about animals always seems to dominate conversations: How are we affecting the animals who live in certain areas? What do they like and dislike? What do they feel? Few if any people doubt that many animals have a point of view and that they do not like much of what we do to them as we subject them to regrettable treatments—using them for food, in education, in research, for amusement; when we move them here and there ("redecorate nature"), break up families, or steal their homes right from under their paws. I place "for food" first, because, in terms of numbers—and in many instances, extreme inhumane treatment—animals who are used for our meals far outnumber those used for other purposes (Goodall 2005; Bekoff 2006).

Interdisciplinary dialogue is essential in discussions of who we are and how we use and abuse animals in a wide variety of contexts (Bekoff 2006; McDaniel 2006; Yarri 2005; 2006). Furthermore, questions about animal minds and who we are in the great scheme of things demand interdisciplinary discussion. I have been very fortunate to be a member of a number of interdisciplinary groups, some of which bridge science, ethics, religion, and spirituality,[1] and, as a result, my own science is better and my previously myopic (and sort of boring) views about the evolution of animal behavior significantly richer. Some of my scientific colleagues continue to ask me why I "waste" my time going to these sorts of gatherings. If they only knew!

I am honored to have had a session at the annual meeting of the American Academy of Religion (2004) devoted to my work. The excellent papers by my colleagues say much, and I can respond only briefly to many of

their points. I am not going to respond directly to any of the papers, but I hope that my essay relates to much of what my esteemed colleagues have written, for their texts more than adequately cover my own work (in some cases better than I do; indeed, I was humbled when Jay McDaniel asked me a question about something I had written, and I had to stop to think not when, but if, I had actually made that claim). Furthermore, I have to admit almost total ignorance about some of what my colleagues are writing (for example, about animism), and their essays readily fill in my gaps in knowledge and make for excellent reading regardless of what I write and despite my own shortcomings. I often wondered what religious scholars would have to say about my work, and now I know: quite a bit!

I consider here some of the "big" areas and "hot" topics that directly and indirectly bear on some of the ideas of my colleagues who have taken the time to read some of my books and essays. I try to cover them jargon-free so that a broad audience can understand the basic issues. Midgley's concern (in Crace 2005) that many people who write about animals don't really know much about their behavior also greatly concerns me. Many books have been written about animals by people who have little if any first-hand experience with the variety of animals about whom they write. We can do better.

Although I have studied a wide variety of animals for more than three decades, I never cease learning about the ones I encounter around my mountain home or in the field. Staring into the eyes of a red fox who sat by my study and watched me type, and watching a female red fox bury her mate near my house, made me reflect deeply on what it was like to be them as they moved about on my hillside (see also Couturier 2005 about how much we can learn from our experiences with urban animals). A recent trip to Kenya and Tanzania opened my eyes to the worlds of elephants, some of the most amazing animal beings I've ever seen up close. These experiences were deeply spiritual and transformational in that not only did I get to observe wild elephants from as close as six inches, but I also could feel their majestic presence and their feelings for one another.

Babyl's story is just one among a host of interesting observations. While watching a group of elephants living in the Samburu Reserve in Northern Kenya, we noted that one of them, Babyl, walked very slowly, and we saw that she was crippled. It was obvious that the elephants in Babyl's group waited for her because she could not travel as fast as they could. When I asked Iain Douglas-Hamilton, who has been studying elephants for almost four decades, about this, I learned that these elephants always waited for Babyl and had been doing so for years. They would walk, stop and look around, see where Babyl was, and wait or proceed depending on where she was. There seemed to be no reason for them to do this, as Babyl could do little for them. They obviously cared enough about Babyl to change their behavior and allow her to continue to be a group member.

Science Sense, Common Sense, and Animals as a Way of Knowing

> Scientists should now be seeking ways to engage in conversation with those animals to find out just what cognition has so far resulted in among the animal nations. (Harvey 2006, 15)

Learning about other animal beings by asking questions such as what it is like to be a dog and how dogs and other animals spend their time, whom they interact with, where they go, what they do and how they do it, their intellectual and cognitive abilities (cognitive ethology), and their emotional lives, is essential for gaining a full appreciation of who animals are. This information also is essential for gaining a full appreciation of human spirituality, what it is to be human, and just what, if anything, is uniquely human. While I consider various topics in the study of animal behavior and cognitive ethology and argue that observational and descriptive information constitute real data (see also Howell 2006; Bekoff 2002a; 2006), their close interrelationship with environmental and other conservation issues means that in many instances one cannot talk about ethology without talking about conservation and vice versa (Bekoff 2002a; 2006; Saunders 2003; Vining 2003).

Cognitive ethology is the unifying science for understanding the subjective, emotional, empathic, and moral lives of animals, because it is essential to know what animals do, think, and feel as they go about their daily routines in the company of other animals and when they are alone (Allen and Bekoff 1997; Bekoff 2002a; 2006). We must pay close attention to what animals do in *their* worlds and also recognize other animals as a "way of knowing." Scientific data, what I call science sense, is but one way of knowing; common sense, intuition, and indigenous knowledge must be given serious consideration as well (Bekoff 2006; Bekoff in press). Science should not assume omniscience. Science is a belief system like other belief systems, with its own assumptions, limitations, and promises. It is important to blend science sense with common sense. We also need to seriously consider the question of what it means to *know* something. I maintain that we *know* that some nonhuman animals feel *something* some of the time, just as human animals do. It is nonsense to claim that we do not know whether dogs or pigs or cows or chickens feel pain or have a point of view about whether they like or don't like being treated in certain ways. The same goes for the live cats and dogs who are used as shark bait on the island of Réunion (Mott 2005). Who are we kidding? Only ourselves.

Some of the big questions and hot topics I touch on here include Who are we in the grand scheme of things? What role does science (science sense) play in our understanding of the world in which we live? What does it means to *know* something? What are some other ways of knowing, and

how do they compare to what we call *science*? What about the use of anecdotes and anthropomorphism to inform studies of animal behavior? Are other minds really all that private and inaccessible? Can a nonhuman animal be called a person? What does the future hold if we continue to dismantle the only planet we live on and persecute the other animal beings with whom we are supposed to coexist? I discuss a few of these questions and issues directly (although some can be nagging and tiresome) that keep emerging among a decreasing number of my colleagues as supposedly good reasons to abandon or to view with skepticism the study of animal emotions and animal sentience. These include who we are and the myth of them-versus-us dualism, anthropomorphism, and ways of knowing other than science. Much of the literature is covered in some of my own (Bekoff 2002a; 2003; 2006) and others' work (Preston and de Waal 2002; de Waal 2005; Dalai Lama 2005).

Animal Emotions and Animal Sentience: Issues and Questions

My starting point concerning animal emotions and sentience is that many animals have rich and deep emotional lives and are clearly sentient. It is not a matter of *whether* emotions have evolved but *why* they evolved in a wide variety of species. Animals will always have secrets, but their emotional experiences are transparent.

Humans and other animals share the neural apparatus and neurochemicals that underlie the expression and experience of a wide variety of emotions. We know that many animals experience rich and deep emotional lives. They feel emotions such as joy, happiness, fear, anger, grief, jealousy, resentment, and embarrassment (Bekoff 2000a, b; 2006; Panksepp 2005a, b; de Waal 2005). Some might also have a sense of humor or even a sense of awe. Perhaps some animals marvel at their surrounds and just enjoy being out where they live. While I concentrate here on mammals, there is compelling evidence that birds also have rich emotional lives (Skutch 1996; Bekoff 2000a, b; 2002a; Rothenberg 2005) and that fish have feelings and feel pain (Sneddon 2003). Recently the city of Rome (Italy) banned cruel goldfish bowls,[2] made dog walking mandatory, and banned docking (cutting off) a dog's tail for aesthetic purposes. There is evidence also that empathy is widespread among animals (Poole 1998; Preston and de Waal 2002; de Waal 2005; Bekoff 2006) and that we should spend our time trying to understand why empathy evolved rather than wondering if it exists. The same goes for sympathy. To quote Charles Darwin, "Those communities which included the greatest number of the most sympathetic members would flourish best and rear the greatest number of offspring" (Darwin [1871] 1936, 163).

What are some of the issues at hand? Here I present a smattering and a glimpse of some of the questions that I ponder almost daily. I want to raise

a number of issues that are important to consider in discussions of animal emotions and animal sentience. Most if not all can be transported into other areas of inquiry in the general field of animal behavior.

Here and elsewhere I argue for a paradigm shift in how we study animal emotions and animal sentience and what we do with the information we already have, "scientific" and otherwise. It is time for the skeptics and naysayers to prove their claims that animals do not experience emotions or feel pain but merely act "as if" they do. Skeptics' denials are vacuous. Until we *know* that animals do not experience emotions or feel pain, let us assume that they do experience rich emotions and do suffer all sorts of pain. Furthermore, just because weak arguments against animal emotions and animal sentience may have worked in the past does not mean that they work now. Animal emotions and animal sentience matter very much, not only because what animals feel must be used to influence how we interact with and use other animals but also because broad studies of animal emotions and animal sentience raise numerous "big" questions about the nature of science itself. We can learn much about ourselves when we ponder the nature of animal passions and beastly virtues.

In this section I outline some of the issues that need to be considered in discussions of animal emotions and animal sentience, some of which I consider here. (For further discussion of those issues that I mention but don't delve into see Bekoff 2006; Bekoff in press.)

1. Are human beings the only animals who experience a wide variety of feelings? As I mentioned, in my view the real question is *why* emotions have evolved, not *if* they have evolved in some animals. So, for example, it is a waste of time to ask whether dogs or chimpanzees experience emotions such as joy, grief, anger, and jealousy. Surely a whimpering or playing dog, a chimpanzee in a tiny cage or grieving the loss of a friend, or a baby pig having her tail cut off—"docked," as this horrific and inexcusable procedure is called—or her teeth ground down on a grindstone feels something. Recent data show that chronic pain is associated with docking ("Settling Doubts" 2005). Cows can be moody, hold grudges, and nurture friendships (Leake 2005). Is this really surprising? Of course not. Animals are not unfeeling objects. They don't like being shocked, cut up, starved, chained, stunned, crammed into tiny cages, tied up, torn from family and friends, or isolated. Pigs and other farm animals are mistreated daily in factory farms. Scientific research shows that pigs suffer from stress, anxiety, and depression. It is no big jump to claim that they don't like having their tails cut off and their teeth ground down. Their squealing tells us that, doesn't it? Pigs can be stressed by even *normal* farm management procedures. This and other findings support the idea that all too often what is called "good welfare" simply is not good enough (Bekoff 2006b).

Animal emotions are not necessarily identical to ours, and there is no reason to think that they must be. Their hearts and stomachs and brains

also differ from ours and from those of other species, but this does not stop us from saying that they have hearts, stomachs, and brains. There are dog-joy and chimpanzee-joy and pig-joy, and dog-grief, chimpanzee-grief, and pig grief. Animals' emotions function as social glue and social catalysts. Their emotions and mood swings grab us. It is highly likely that many animals exclaim "Wow!' or "Goodness, what is happening?" as they go through their days enjoying some activities and enduring pain and suffering at the hands of humans. What animals feel is more important than what they know when we consider what sorts of treatment are permissible. When in doubt, we ought to err on the side of the animals.

2. What are some of the difficult questions in studies of animal emotions and animal sentience that go "beyond" science—or what we think science is and what we think science can do? Is science the only show in town? Are there different ways of knowing? What are they? How can we blend them all together?

3. Is what we call *science* really better than other ways of knowing (such as common sense and intuition) for explaining, understanding, and appreciating the nature of animal emotions and animal sentience and for predicting behavior? This is an empirical question for which there are no comparative data, despite claims that science and objectivity are better. Until the data are in, we must be careful in claiming that one sort of explanation is always better than others. It is poor scholarship to take a univocal approach in the absence of supportive data.

No science is perfect; it's "just science." But "just science" is not a pejorative expression. We need to come clean about what science is, what we can prove and not prove, and how good the scientific data are. Scientists are responsible not only for sharing their findings with the public but also for letting them know that science is a value-laden and imperfect enterprise. Scientists should not make science something that it is not.

Let us also not forget that many explanations about evolution are stories with more or less authenticity or "truth." Along these lines, we need to ask certain scientists how they can come into their laboratory and tell everyone how smart or happy or depressed their dog is and then put that all aside and do horrible things to other dogs. This sort of moral schizophrenia is difficult to understand but is not all that uncommon (Rollin [1989] 1998). What is the difference in morally relevant emotional capacities and the ability to suffer between a dog in a home and a dog in a research facility? Nothing.

4. Is science value-free? What background values underpin how science is done and data are interpreted? Are scientists unfeeling automatons who don't have a point of view that influences their research? Scientists are human beings with different points of view on what they do and why, and they, like others, have to make a living, perhaps support a family, and pay taxes. To ask questions about science is not to be antiscience.

5. Are anecdotes really useless? Is anthropomorphism all that bad? Is subjectivity heresy? Should we have to apologize for naming the animals we study? I have more to say on these questions below.

6. Do individual animals have inherent value independent of the instrumental value that we impose on them?

7. What do we *really know* about animal emotions and animal sentience? What do we think the taxonomic distribution of animal sentience is, and why? Does this matter for influencing how we treat other animals?

8. Do we know more than we think we know?

9. Does what we know about animal emotions and animal sentience translate into action on behalf of animal beings?

10. What does each of us *believe and feel* about animal emotions and animal sentience?

11. Does what we believe and feel about animal emotions and animal sentience translate into action on behalf of animal beings?

12. For those of us whose work involves using animals, what do we feel about animal emotions and animal sentience when we are alone, away from colleagues, and pondering how we make our livings? Are we proud of what we do to and for other animals, and do we want others, including our children, to follow our path? Should we continue what we are doing?

13. What do we tell others, including our children, about how we make our livings? What words do we use, and how do we explain the emotions and passions of animals who are used and abused for our, not their, ends? What do we tell them about where their dinner comes from?

14. How do we remain hopeful? There are some good things happening, such as the international conference on animal sentience organized by the Compassion in World Farming Trust (CIWF) in March, 2005 (CIWF 2005). And the recent victory of Helen Steel and David Morris against McDonald's[3] gives us hope. We must remain hopeful, but time is not on our side. We are engaged in a rapidly growing social movement, and we must educate others and have them consider difficult questions that are easier to put aside.

15. Where do we go from here? How do we educate and open minds and hearts? How might we work together to make the world a better place for all beings? The situation *must* change; how are we going to accomplish our goals?

16. Should sentience be the key factor in deciding how animals should be treated, and if so, why? Isn't just being alive sufficient to leave animals alone? There are difficult and frustrating questions to ponder, and they won't go away even if we ignore them.

17. We must change minds and hearts, and time is of the essence. Far too many animals are harmed every second of every day worldwide on our behalf in the name of food, in the name of science, in the name of human

progress, in the name of this or that. We are an intrusive species that brings pain and suffering to other animals when we use and abuse them.

18. Why do we do what we do? Decisions about animal use and abuse are individual choices, and none of us should claim that we do things because others "make us" do it. Harming and killing other beings—human animals, other animals, and even other forms of life such as trees, plants, and bodies of water—is a personal choice. If we all owned up to our personal choices, I believe that the world would become a more peaceful place. And what a poor example the line of reasoning "Someone else made me do it!" sets for children. Each of us is responsible for our actions, and the convenience of blaming others—including and especially large impersonal entities—should be discouraged. Individual responsibility is critical. It would be a good idea for all of us to leave our comfort zones and to grow—to expand our horizons as we work to replace cruelty with compassion. An important question to ask is, Would we do what we did again?

19. We need a paradigm shift in how we study animal emotions and animal sentience. We can and do make a difference. Animal emotions and animal sentience matter very much. What should our guidelines be? Perhaps there are some types of studies that simply cannot be done.

20. Good, right-minded people can do and/or allow horrible things to be done to animals because they have not traveled deep into their hearts or because they just don't know. We need to educate them, and that is something we can do. If we can change minds and hearts and especially current practices in which animals are abused, we are making progress, and there is hope.

Evolutionary Continuity: We Are Not Alone

> I have stressed the degree to which perceived animal/human differences in the brain's organization of feeling and emotion are probably due to artifacts rather than to a real gap between primates (including humans) and other mammalian orders. But that is not to say there is no real difference at all between humans and other animals. There may indeed be a real difference in brain organization of emotion. If so, however, it is quantitative in nature and moderate in degree—not a qualitative or massive difference. . . . Neural substrates of feeling and emotion are distributed throughout the brain, from front to back, and top to bottom. The same brain structures are implicated in affective reactions for both humans and other animals. (Berridge 2003, 41–42)

It is essential to learn more and more about the lives of other animals, because learning and knowledge lead to an understanding of animals as individuals and members of a given species, and understanding leads in turn to appreciation and respect for the awesome and mysterious animal beings with whom we share the planet. Comparative approaches to the study of animal emotions and animal sentience allow us to see how different species and individuals solve the myriad problems that they face.

We can learn much about humans by carefully studying our animal kin and listening to their stories. One reason for my fascination with the study of animal behavior—especially animal cognition, animal emotions, animal morality, and how humans intrude into the lives of other animals—is that I want to learn more about why humans and other animals have evolved both similarly and differently. The more we come to understand other animals, the more we will appreciate them as the amazing beings they are, and the more we will come to understand ourselves. Their interests and concerns are as important to them as ours are to us (Sharpe 2005).

Of course, some people want to learn more about animals to make the case for human uniqueness, usually claiming that humans are above and better than other animals. But the more we study animals, and the more we learn about them and us, the more we discover that there is not a real dichotomy or nonnegotiable gap between animals and humans, because humans are, of course, animals. There is evolutionary continuity. Rational thought, consciousness, self-cognizance (Bekoff and Sherman 2004), art, culture, language, and tool use and manufacture can no longer be used to separate "them" from "us." Many animals also have a sense of morality, knowing right from wrong in their worlds (Bekoff 2004; 2006), so the having of moral sensibility does not make humans unique. What is interesting about research on morality in animals is that much of it centers on animal play behavior, an activity that looks to be thoroughly frivolous but is serious business (Bekoff 2004; 2006). Empathy also is not uniquely human. Recent research clearly shows that empathy is widespread among many different groups of animals (Preston and de Waal 2002; de Waal 2005; Bekoff 2004; 2006). Some nonhuman animals might also be called "persons" (Bekoff 2002a, 2006, and references therein; see Howell 2006 and Harvey 2006 for a discussion of the notion of other-than-human-"persons"). Perhaps cooking food is uniquely human (Wrangham and Conklin-Brittain 2003), and I sometimes wonder if, and worry that, sadism is a uniquely human characteristic.

Here is some more information to support the claim that human uniqueness is getting harder to defend. Almost daily we learn of "surprises" about animal behavior. New Caledonian crows are better at making and using tools than many primates are, and fish show culture (Bshary, Wickler, and Fricke 2002). Primatologists have identified about forty different behavior patterns that show cultural variation in chimpanzees (tool use, grooming, patterns of courtship; see, for example, de Waal 1999; 2005; Whiten et al. 1999). Female killer whales are known to spend years showing their youngsters how to hunt elephant seals. Researchers have compiled a list of almost twenty behavior patterns in cetaceans that are influenced by local tradition and show cultural variation. Frans de Waal, a primatologist at Emory University, tells a story of how enamored of a painting some art critics were only to change their minds when they discovered that a chim-

panzee was the artist. In the prestigious journal *Science* researchers in Germany reported that a dog named Rico understands about two hundred words and was able to figure out that an unfamiliar sound referred to an unfamiliar toy (Kaminski, Call, and Fischer 2004). Rico inferred the name of unfamiliar toys by exclusion learning and showed patterns of learning similar to those of young humans. The study of Rico reminded me of a paper published almost eight decades ago in the *Quarterly Review of Biology* (Warden and Warner 1928) about the sensory capacities of dogs, especially a male called Fellow. What I love about this paper is the authors' claim that "Much of what the average man 'knows' about his own dog, and about dogs in general is, of course, quite unknown to the animal psychologist."

It is best to keep an open mind. Just because animals don't do something when we ask them to do it in certain experimental conditions, or just because we don't see other animals do something that we would expect them to do based on our own expectations, doesn't mean that they can't do amazing things in other contexts.

Just who do we think we are? Drawing lines between species in terms of cognitive skills or emotional capacities can be very misleading, especially when people take the view that nonhuman animals are "lower" or "less valuable" than "higher" animals, where higher usually means primates, nonhuman and human (see Yarri 2006; Harvey 2006; Sharpe 2005). In many ways we are them and they are us. Them-versus-us dualisms do not work; neither does the misleading claim that there are higher and lower species. *Higher* invariably and arrogantly means human. We are not alone.

Darwin's idea of evolutionary continuity, in which differences among species are differences in degree rather than in kind, has never been truer than it is today, especially in the study of animal intelligence and animal emotions. Sure, we are unique and special, as many claim, but so are all other animal beings. Of course, we can define other animals away if we so choose. In fact, we can do anything we want if we so choose, and I find this a frightening thought. All individuals count, and a worldview that concentrates on certain species leaves far too many animals suffering immeasurably in our wake of growth and destruction.

Caution surely is the best road to take when offering generalizations, especially about complex behavior patterns, animal thinking, and animal emotions. Not only are there differences in behavior *between* species (called interspecific variation), but also there are marked individual differences *within* species (called intraspecific variation). These differences make for exciting and informative research concerning, for example, why wolves and dogs differ and why even littermates and siblings may differ from one another. Many of the coyotes I studied in the Grand Teton National Park in Wyoming lived in packs, but just down the road coyotes lived either alone or as mated pairs. Thus, making general statements that the coyote

behaves this way or that is very misleading, because "the coyote" does not exist. The same is true for tool use in chimpanzees and orangutans. Not all of these great apes use tools, and it is challenging to discover why tool use has appeared in some populations but not in others. Intraspecific variation in behavior has been observed in many animals including insects. A bee is not a bee is not a bee, just as a person is not a person is not a person. Humans and other animals are individuals.[4]

There Is No Great Divide: Animals Do Think

> "But," you say, "man is an exception." Then, according to the ancestral principle, so are his fathers and his grandfathers, and in an endless line, all his ancestors. . . . Here, then, are the consequences: monkeys do not think; their descendants do not think, since a descendant can do only what his ancestors did. Now these scientists, according to their own established theory of evolution, are among the descendants. The conclusion is inevitable. If their proposition and their logic have any consistent value, then the scientist who thinks that animals do not think belong himself to a hopelessly unthinking species." (Long 1906, 15)

Recently, Clive Wynne wrote a book with the catchy title *Do Animals Think?* (2004a). He concluded that, while we don't know much about animal thinking, what passes as animal thinking can be readily explained without appealing to much at all going on in the heads of other animals. Even animals to whom we commonly attribute active minds and a good deal of conscious thought—companion animals, dolphins, and great apes—really don't think much about anything. Here and elsewhere Wynne (2004b, c), in his unbridled advocacy of behaviorism, believes that we should be very cautious about ascribing consciousness to animals and that anthropomorphic explanations have no place in the study of animal behavior. Wynne also believes that, while there are similarities among some animals and humans, the differences count more and are pretty big.

But are they? Does Wynne include all animals or only some species in his arguments for mental discontinuity?

Wynne claims that language, culture, imitation, and the ability to take another individual's perspective (commonly referred to as the having of a theory of mind) "are almost entirely lacking in any other species" (2004a, 7). What does *almost* mean? Perhaps it's all shades of gray. Surely, few if any would claim that other animals are *identical* to us, but arguments invoking Darwin's notion of evolutionary continuity leave room for small differences and large similarities (differences in degree rather than differences in kind). Clever Hans (the horse who supposedly could count) aside, there are many data that show that members of some species imitate others, empathize with others, are able to take another's perspective in certain situations (with supportive neurobiological evidence), and have culture and rather sophisticated patterns of communication. Wynne's behaviorist views show little concern for how diverse behavioral patterns have evolved.

The behavior of many animals is far too flexible and situation-specific to be explained in terms of simplified stimulus-response contingencies. Marked within-species variability is quite common, and this adaptive variability lends itself readily—often but not always—to more "cognitive" explanations invoking consciousness, intentions, and beliefs (see essays in Bekoff, Allen, and Burghardt 2002).

It remains to be shown how large the differences between humans and other animals are, for there are not enough data to support Wynne's sweeping beliefs. You can't have it both ways, claiming that there aren't enough data available to make definitive statements and then offering them nonetheless. This is not a good lesson for students or for non-researchers who want to learn about animal behavior. While Wynne argues for an objective study of behavior, ironically much of his book reinforces the notion that science is not value-free and that we all come to our science with an agenda. "Objective science" is very much an oxymoron.

Wynne also briefly discusses animal pain, with heavy skepticism about what animals feel and whether it should matter in how we treat them. He likes philosopher Jeremy Bentham's claim that the key question about animal treatment is whether they can suffer and not what they know or whether they can reason, but, after questioning whether animals feel pain, Wynne notes that even if we could measure pain "it is still not clear that this would tell us what to do and to whom" (2004a 240). Perhaps Wynne's views on matters of animal well-being are best summed up when he writes: "Animals . . . are valuable to us because of who we are, not what they are. Things don't have to be like us to be important to us" (p. 242). Surely, animals are not "things" like backpacks or cars, and surely animals' worth should not be measured by their utility to us; animals have value because they exist.

Eyes Tell It All

Dare to look at them if you can. I can't.

If you really want to know about what animals are feeling, go right to their eyes, the magnificently complex organs that provide a window to the world. Across many species an individual's eyes reflect feelings: wide open in glee, sunken in despair.

Jane Goodall writes about the young chimpanzee Flint's sunken eyes as he grieved the loss of his mother, Flo (1990, 196–97). Konrad Lorenz notes how the eyes of a grieving goose sink back into its head (1991, 251). Jody McConnery writes of traumatized orphan gorillas: "The light in their eyes simply goes out, and they die" (in McRae 2000, 86). And Aldo Leopold describes the "green fire" in the eyes of a dying wolf he'd just shot (1948, 129). I often wonder about animals whose eyes we can't look into.

Doug Smith, who leads the Yellowstone wolf reintroduction project, recently wrote about the eyes of a wolf named Five and how much he learned from looking into them:

> The last time I looked into Five's eyes . . . she was walking away from an elk her pack had killed. . . . As we flew overhead, she looked up at us, as she always did. But the look she gave me had changed. To gaze into the eyes of a wild wolf is one of the holiest of grails for lovers of nature; some say what you see is untamed, unspoiled wildness. . . . That day in January, something had gone out of Five's eyes; she looked worried. Always before her gaze had been defiant. (Smith 2005, 33)

And then there's the story of Rick Swope and the chimpanzee JoJo. When Rick was asked why he risked his life to save JoJo, who had fallen into a moat in the Detroit Zoo and was drowning, he answered: "I looked into his eyes. It was like looking into the eyes of a man. And the message was: 'Won't *anybody* help me?'" Recently, three men near my hometown of Boulder tried to save a young mountain lion who'd been hit by a car. The lions' eyes begged them to do so. I stopped killing cats as part of a doctoral research project when Speedo, a very intelligent cat, looked at me and asked, Why me? Frankly, I could not find the words to tell him why or how badly I felt for torturing and then killing him.

Eyes tell it all. If we can stand it, we should look into the fear-filled eyes of animals who suffer at our hands, in horrible conditions of captivity: in slaughterhouses, zoos, rodeos, and circuses. Dare to look into the sunken eyes of animals who are afraid or feeling other sorts of pain, and then try to tell yourself and others that these individuals aren't feeling anything.

Writing about the importance of eyes makes a great case for some of our intuitions' being borne out by hard science. The prestigious journal *Nature* published a very interesting study called "Staring Fear in the Face" (Vuilleumier 2005). It turns out that the eyes are of paramount importance in knowing that another human is feeling fear. People tend to look at the eyes, and more so when the face is fearful. A study of a woman with a deficit in recognizing fearful facial expressions because of damage to a region of her brain called the amygdala showed that she could not perceive fear because she didn't look spontaneously toward the eyes. Rather, she judged the face as having a neutral expression. It is likely that the eyes are important in perceiving not only fear but also other emotions. The results of this study lead me to think that perhaps one reason that so many people cannot look into the eyes of an animal who is afraid or otherwise suffering is because they know just what the animal is feeling, and it is easier to deny this if one doesn't look at the animal's eyes and feel the fear emanating from the poor beast.

The Growth of the Science of Animal Behavior

The study of animal behavior has burgeoned over the past four decades. People worldwide are interested in the behavior of animals because knowledge about animals enriches their lives. There are many more professional journals in animal behavior and behavioral ecology now than there were

thirty to forty years ago, and many universities offer undergraduate and advanced degrees in the behavioral sciences. Videos and movies about animals abound. Many people want to remain connected to or reconnect with animals. Our brains are not all that different from those of our ancestors who were more connected to the animals with whom they shared their habitats. Thus, our old brains seem to drive us to keep in touch with animals and with nature in general. It is not natural to be alienated from other beings and it feels good to interact with them.

In 1973, an exciting and thoroughly unexpected event occurred when Konrad Lorenz, Niko Tinbergen, and Karl von Frisch won the Nobel Prize for Physiology or Medicine for their pioneering work in animal behavior. Lorenz, Tinbergen, and von Frisch are called *ethologists*, a word that often is reserved for those researchers who are concerned with the evolution or ecology of behavior and who also conduct fieldwork. Lorenz and others stressed that behavior is something that an animal "has" as well as what he or she "does" and is a phenotype on which natural selection can act. Nowadays, ethological research also is conducted on captive animals (as was most of Lorenz's research), and for many people the terms *ethology* and *animal behavior* have become synonymous.

Winning the Nobel prize was an amazing feat for researchers who studied such phenomena as imprinting in geese, homing in wasps, hunting by foxes, and dancing in bees, and some scientists who conducted biomedical research were miffed that such "frivolous" pursuits merited the most prestigious award, what is called *the* prize for scientific research. Also, these three men were having fun doing their groundbreaking research, and in many scientific circles this was not acceptable. Lorenz has been filmed donning a fox coat and hopping along the ground to see how geese would respond to him.[5]

What is so exciting about the study of animal behavior is how many surprises keep springing up as new information accumulates showing just how fascinating and complex animal behavior can be (Bekoff 2006). Fish show complex patterns of culture and social cognition and most likely experience pain. Recent research has shown that fish respond to the pain reliever morphine and that pain-related behaviors are not simple reflexes. Chickens can recognize and remember more than one hundred other chickens in their social pecking order. Many animals show distinct personalities and idiosyncratic quirks, just as humans do. There are extroverts, introverts, and agreeable and neurotic animals. "Shy" laboratory rats might not live as long as more adventurous rats. Stress may cause premature aging. Chimpanzees can remember how to count three years after they last performed a task that required them to count, and a seal showed that he could remember the concept of "sameness" after a twelve-year period. Two elephants, Shirley and Jenni, remembered one another when they were inadvertently reunited after being apart for twenty years. Gorillas recently

have been observed for the first time to use tools—in this case, to measure the depth of water. Captive chimpanzees converse about food that they find in their pens (Appel 2005). It recently has been suggested that mice might sing and that their patterns of communication may be more complex than previously appreciated (Holy and Guo 2005; see also Panksepp 2005a about laughter in rats). A landmark field experiment has shown that African elephants show higher levels of interest in the skulls and ivory of members of their own species than they do to natural objects or to the skulls of other large terrestrial mammals (McComb, Baker, and Moss 2005).

On the lighter side, fish and snakes appear to communicate by passing gas. What a good and economical use of a natural bodily function! Even Aristotle took a break from serious philosophizing and was concerned with animal flatulence. In his *History of Animals,* a veritable gold mine of natural history about a wide variety of animals, he noted that the "wind" that lions discharge is very pungent. (However, he did not postulate that it was used to communicate with other lions!)

Animals are not immune from rare natural events. Captive hamadryas baboons have been observed to show a reduction of rates of locomotion and threat behavior when there was a solar eclipse. And howler monkeys showed a 42 percent decrease in population size and major social disorganization after hurricane Iris destroyed the forest in which they lived in southern Belize in October 2001.

As we attempt to learn as much as we can about animal behavior, solid scientific data, stories, anecdotes, myths, and lore all are needed. Information from dog parks, field sites, and facilities where animals are kept all can be used to learn about animals. Detailed descriptions of behavior patterns, careful observations, and ethically justified experiments that do not harm the animals we are interested in are all important components of a comprehensive approach to animal behavior. When we perform research that stresses animals we may be unable to answer the very questions in which we are interested. Often animals are stressed by our mere presence, so we cannot accurately study their more natural patterns of behaviors. I and my colleagues believe that this is a major problem that needs to be studied and understood so that the data we collect are as reliable as possible and the questions in which we are interested are answered with as little ambiguity as possible.

Animals can do amazing things and accomplish incredible feats, but sometimes they do not do what we ask of them. They have their own points of view, and sometimes they express them freely. An animal might not be motivated to do something because she is tired, not hungry or thirsty, or perhaps just wants to be left alone. Also, because we are not sensitive to the sensory worlds of animals, we may be asking them to respond to a stimulus to which they are not sensitive—a sound that is outside of their range of hearing, a color that they cannot see, or an odor that they cannot

perceive. The sensory world of animals is quite different among different species and also varies from our own.

One important lesson that I emphasize in my classes is that "does not does not mean cannot." Just because an animal does not perform a particular task does not mean that he or she cannot. A wolf might choose not to chase an elk, and a robin might not discriminate friend from foe, but their inaction does not mean that they cannot do these things.

Humans—researchers and nonresearchers alike—often try to package nature and to sanitize and simplify the behavior of other animals. Sometimes simple answers to complex questions suffice, and at other times they do not. Experts can disagree, and this is good for science in general. Disagreements fuel future research for curious minds. Just when we think we know all there is to know we learn that this is not so. "I don't know" is one of the best admissions that a researcher can make, because admitting that there are mysteries still to be uncovered and acknowledging disagreements also can fuel future inquiries. Award-winning poet Mary Oliver captures it well in her lines from "Her Grave": "A dog can never tell you what she knows from the smells of the world, but you know, watching her, that you know almost nothing" (1992, 15).

While there are many behavioral phenomena about which we know quite a lot—we can make reliable predictions about what an individual is likely to do in a given situation—there are some areas in which we know next to nothing. The minds of other animals are private, as are human minds. Even though we may know much academically about the physiology and anatomy of a dog's nose or of a bat's ears, we still do not know with certainty, experientially, what it is like to be a dog, or a bat, or a termite. When we study the concept of self-knowledge in animals using mirrors, even if we collect data that suggest that dogs do not have as high a degree of self-awareness as chimpanzees do because dogs do not respond with self-directed movements as chimpanzees do when they look at their reflection in a mirror, it is possible that dogs do have a high degree of self-awareness but that the use of a mirror does not tap into this ability. Perhaps assessing a dog's response to different odors, including its own, would yield different results. My own study of a dog's response to his own and to other dogs' urine ("yellow snow") showed that this might be the case (Bekoff 2001). Animals use different sensory modalities.

Along with curiosity and creativity, patience is a virtue when it comes to the study of animal behavior. I well remember many hours spent sitting cold and alone among 250,000 Adélie penguins at the Cape Crozier rookery on Ross Island in Antarctica just waiting for them to do so something—anything—besides stealing rocks from each other's nests or sleeping or staring at me trying to figure out who I was: curious observer or new land predator? I also recall falling asleep while waiting for a coyote to wake up and join other pack members who had decided to move to another

area. Patience is needed in data analysis also. Watching videotapes over and over again and doing the appropriate statistical analyses can try anyone's patience, but these activities are just as important as collecting reliable data is. They may not be all that much fun, but they are essential.

Persistence is important as well—not giving up on some idea just because others think it is wrong. One might or might not be heading in the wrong direction. One needs to analyze the arguments of supporters and critics alike. If the late William Hamilton III had not been persistent in pursuing his revolutionary ideas about the evolution of social behavior via kin selection, the field of animal behavior would have suffered an enormous loss. Had Jane Goodall not insisted on naming the chimpanzees she studied at Gombe stream in Tanzania, there would have been a delay in our coming to recognize that individuals had distinct personalities. Goodall also was the first researcher to observe chimpanzees use a blade of grass as a tool to extract a termite meal from a hole, but many other researchers did not believe her until she showed them a videotape of the activity. Had I given up the study of social play, as some of my colleagues suggested I do when I was a graduate student, I would never have discovered over the next twenty-five years the important connections between social play and the evolution of fairness, trust, and morality. Years of detailed video analysis, discussions with colleagues from different disciplines, and a belief that I was onto something big kept me going. Imagine if Darwin had given in to his critics when he wrote about his theory of natural selection!

As Donna Haraway notes in her book *The Companion Species Manifesto* (2003, 19):

> To do biology with any kind of fidelity, the practitioner must tell a story, must get the facts, and must have the heart to stay hungry for the truth and to abandon a favorite story, a favorite fact, shown to be somehow off the mark. The practitioner must also have the heart to stay with a story through thick and thin, to inherit its discordant resonances, to live its contradictions, when that story gets at a truth about life that matters.

I could not agree more with her sentiments.

Anecdotes and Anthropomorphism

> It is possible, therefore, that your simple man who lives close to nature and speaks in enduring human terms, is nearer to the truth of animal life than is your psychologist, who lives in a library and today speaks a language that is tomorrow forgotten. (Long 1906, 26)

Among the reasons that some researchers are skeptical about research on animal thinking and animal minds is their concern about what I call the "a" words—*anecdote* and *anthropomorphism*. Discussions of these words involve interdisciplinary dialogue including that with theologians and religious leaders. Critics claim that anecdotes are not sufficient data (a view with which I and other "rich cognitivists" agree) and that anthropomor-

phism is needless and wrong. I have argued repeatedly that the plural of anecdote is data and that we *must* be anthropomorphic. Anecdotes and stories drive much of science and, of course, are not enough on their own, but to claim that they are not a useful heuristic flies in the face of how hard science and soft science are conducted.

Let us consider the views of a vociferous skeptic. Wynne (2004a, b, c) believes that anthropomorphic explanations are extremely imprecise, and he privileges reductionistic stimulus-response explanations over explanations that appeal to such notions as consciousness, intentions, and beliefs. However, Wynne does not scientifically support his position. Many who favor mechanistic explanations have not spent much time watching free-ranging animals. Surely, given the complexity and flexibility of behavior no explanatory scheme will be correct all of the time. More important, Wynne ignores the fact that the utility and accuracy of various sorts of explanations have not been assessed empirically, so we really do not know if his flavor of explanation is better for understanding and predicting behavior than those he eschews. Until the data are in we all must be careful in claiming that one sort of explanation is always better than others.

Anecdotes and anthropomorphism frequently have been used to bash the field of cognitive ethology (Allen and Bekoff 1997; Bekoff and Allen 1997; Bekoff 2002a). There are many different ways of describing what animals do. How one chooses to summarize what they see, hear, or smell depends on the questions in which one is interested. There is not only one correct way to describe or to explain what animals do or feel.

Anecdotes, or stories, always find their way into people's views of animals. Some of my colleagues dislike or ignore anecdotes because they are "merely stories" with little or no substance; they are not "hard data." However, much of our theorizing about the evolution of behavior also rests on better or worse stories, and few people find this objectionable—perhaps because there is the widely accepted central unifying theory of natural selection.

Anecdotes are central to the study of behavior, as they are to much of science. As we accumulate more and more stories about behavior we develop a solid database that can be used to stimulate further empirical research—and additional stories. The plural of anecdote is data. Stephen J. Gould (2000) has stressed the importance of case studies in science. Anecdotes, like anthropomorphism, can be used for the betterment of science if we carefully assess how we are using them.

Anthropomorphism has survived a long time, because it is the only reference point and vocabulary we have. It must be done carefully and biocentrically (Bekoff 2000b), as we make every attempt to maintain the animal's point of view by asking "What is it like to be _____?" Claims that anthropomorphism has no place in science or that anthropomorphic predictions and explanations are less accurate than behaviorist or more

mechanistic or reductionistic explanations are not supported by any data. This is an empirical question for which there are no data. Anthropomorphism is alive and well, as it should be; but, again, it must be used with care.

Frans de Waal, in his book *The Ape and the Sushi Master* (2001), introduces the notion of "anthropodenial," a practice in which a dualism, or distinct separation between humans and other animals, is suggested. Differences, rather than similarities or evolutionary continuity, are stressed.

Some people argue against the use of the "a" words without seeming to know that they are using them. For example, a representative of the American Zoo and Aquarium Association (AZA) recently claimed that we must not be anthropomorphic and that it is bad science to attribute humanlike feelings to animals. He was critical of people who claimed that an elephant at the Los Angeles Zoo "wasn't doing well"—but in the same breath he claimed that the elephant was "doing well" and should not be sent to an elephant sanctuary.[6]

The minds and feelings of individuals other than one's self are private. Access is limited, because we cannot really get into the head or heart of another being. Skeptics often use this solipsist's line of reasoning, but it can be a dead end when practical matters are of primary concern. Of course other minds are private, but that doesn't stop us from trying to understand what another human is thinking or feeling and using this information to make future compassionate decisions.

When considering the emotional lives of animals, skeptics can be sanguine concerning the notions of proof or what is actually known, often employing a double standard. In practice this means that they require greater evidence for the existence of animal emotions than they do in other areas of science, a point stressed by the late Donald Griffin. But because subjective experiences are private matters, residing in the brains of individuals and inaccessible in their entirety to others, it is easy for skeptics to claim that we can never be sure about animal emotions and declare the case closed. Nonetheless, a cursory glance at many studies in animal behavior, behavioral ecology, neurobiology, and biomedical research shows clearly that only rarely do we ever come to know *everything* about the questions at hand, yet this does not stop us from making accurate predictions concerning what an individual is likely to do in a given situation or from suggesting the use of various treatments to help alleviate different diseases. Accurate predictions can be made in the absence of incontrovertible proof or total certainty—something that few scientists can ever offer.

It's also important to consider the power of prediction for different types of knowledge. No one has yet shown that one form of prediction is better than others and this is still an open question (Bekoff 2004; 2006). Is science sense a better predictor than common sense in the study of animal emotions and sentience? I can't find any hard data on this question. Clearly,

even when scientific data are available individuals interpret them differently and the data may not even be used. This is so in other fields as well. E. Meir, S. Andelman, and H. P. Possingham (2004) have shown that scientific data about species' abundance actually plays little or no role in determining which species are placed on the endangered species list in the United States. Opportunism and other factors play more of a role.

Self-cognizance in Animals

I often wondered if Jethro, my late canine companion, knew who he was. Do animals exclaim "Wow! That's me!"? People who know me are not surprised when I ask such questions. I also ponder whether chimpanzees, cats, elephants, dolphins, magpies, mice, salmon, or ants or bees have a sense of self. What do these animals make of themselves when they look in a mirror, see their reflection in water, hear their own or another's bark or howl, or smell themselves and others? Is exclaiming "Wow, that's me!" a uniquely human peculiarity? Some people do not want to acknowledge the possibility of animal self-awareness, because then borders between humans and other animals would become blurred, and their narrow, hierarchical, anthropocentric view of the world is toppled. Are we really that unique or special? Recall Darwin's ideas about evolutionary continuity—that differences in behavior among various species are differences in degree rather than in kind. Self-cognizance in animals is also a practical matter; what animals might know about themselves is crucial to studies of animal pain and suffering.

Many researchers are eager to discover what animals know about themselves. Some argue that high levels or degrees of self-cognizance have evolved in a wide variety of animals, whereas others believe that only great apes have rich notions of self (knowing who they are and/or having a theory of mind, which means being able to infer the states of minds of others). Still others argue that it is methodologically too difficult to address this question because animal (like human) minds are subjective and private. Some in this latter category do not attribute any sense of self to animals other than humans and question whether animals are conscious of anything at all.

I revised my thinking about animal selves based on long conversations with Paul Sherman, a behavioral ecologist at Cornell University. I had written a short essay for the journal *Nature* (Bekoff 2002b) on the topic of animal selves. Sherman contacted me after reading this piece, and my collaboration with him was very rich and challenging and resulted in my revising some of my ideas and fleshing out degrees of self-cognizance in much more detail. Perhaps some animals *do* have a sense of "I-ness" but we just have not been able to access it using methods that do not tap into the neural underpinnings of selfhood. Sherman and I wrote a paper together (Bekoff and Sherman 2004) in which we argue that there are degrees of self-cognizance. We present a new scale of animal selves and offer

"self-cognizance" as an umbrella term to cover a continuum ranging from self-referencing to self-consciousness. The terms we use in our scale are "self-referencing" (also referred to as self-referent phenotype matching and the "armpit effect"); "self-awareness" (also referred to as "perceptual consciousness" and "body-ness" or "mine-ness"); and "self-consciousness" (analogous to "reflective consciousness," "sense of self," "I-ness" and "I-self"; having sympathy, empathy, and a theory of mind also are included). We wanted to introduce terminology that could be used as a standard among different researchers and also open doors for discussion among interested colleagues.

Sherman and I hypothesized that species exhibit different degrees of self-cognizance, which reflect variations in their social environments and life histories. The position of an individual on the self-cognizance continuum is based on the degree to which members of its species or group engage in repetitive competitive or cooperative interactions with the same conspecifics over their lifetimes and benefit from changing their responses in light of outcomes of those previous interactions. We also stressed the development of noninvasive neural techniques to study self-cognizance in animals.

Sherman and I concluded that we must return to basics by revising our definitions, refocusing our questions, giving more attention to the way in which different sensory modalities are involved in animal self-cognizance, and developing an agreed-upon terminology. Interdisciplinary collaboration also is a must. We invoked Darwin's notion of evolutionary continuity to argue that differences among species are differences in degree rather than in kind and that we actually know very little about the taxonomic distribution of self-cognizance in animals. If we look at self-awareness as body-awareness, we might also discover more about how animals think and the perceptual and neurobiological processes underlying various cognitive capacities. Darwin's ideas about evolutionary continuity along with empirical data and common sense caution against the unyielding claim that humans and perhaps other great apes and cetaceans are the only species in which some sense of self has evolved.

In no way do Sherman and I believe that we have the final answers. Our paper was meant to stimulate researchers and others to revisit fundamental assumptions and to foster interdisciplinary discussion.

I generally assume that many animals are conscious and have some sense of self. I take an evolutionary approach to the subject and ask why, not if, consciousness and a sense of self evolved in certain animals. To answer such a question we need to recognize that there are degrees of self and that we need to take into account individuals' social needs and sensory worlds. We need to go to the animals.

While there are important academic reasons to study self-cognizance in animals, there also are important practical reasons to learn about animal

selves. Answers to challenging questions about self-cognizance have wide-ranging consequences, because they often are used by researchers and lawyers as a litmus test for defending the sorts of treatments to which animals can be ethically subjected. However, it is not clear that self-awareness or other cognitive capacities should be used for such decisions. Some argue that a sense of "I-ness" is morally relevant and necessary for experiencing pain. However, even if an animal does not know *who* she is, this does not mean that she cannot feel "something painful happening to this body." Just because the experience of pain may not be the same across species, this does not mean that individuals of different species do not suffer their own type of pain. Self awareness is not a reliable test for assessing well-being. Here, it is worth recalling Jeremy Bentham's well-known claim concerning animal suffering: "The question is not, Can they *reason*? nor Can they *talk*? but, Can they *suffer*?" ([1789] 1996, chap. 17)

So, do any animals ever exclaim "Wow, that's me!"? We do not know, especially for wild animals. It is time to get out of the armchair and into the field. Speculation does not substitute for careful studies of behavior. The stakes are high. Answers to questions about self-cognizance often inform where humans place themselves in the evolutionary scheme of things and influence how animals are treated.

Wild Justice and the Evolution of Morality

My current research on the evolution of morality in dogs, wolves, and coyotes shows clearly that during social play individuals of these species fine-tune their play so that play can continue without breaking out into fighting. Play signals are used carefully and nonrandomly to signal "This is play" or "I'm going to bite you, but it's only in play" or "I'm sorry I bit you, let's continue playing." Play signals are honest signals and rarely used to deceive others. Details are provided elsewhere (Bekoff 2004; 2006), but suffice it to say that animal play is highly cooperative and likely contains elements of fairness, trust, apology, forgiveness, and empathy. Animals also enjoy playing.

If we keep open minds, the idea of animal morality is not any more silly than the well-accepted idea that many animals are thinking and feeling beings. Naysayers' arguments ignore what we already know to be true for many different species. Surprises are always in store as we continue to learn about the intelligence and cognitive and emotional capacities of animals. We need to be careful that our expectations do not lead us down the wrong path especially in the absence of information. But it is abundantly clear that we do not have to ascribe to animals farfetched cognitive and emotional capacities to reach the conclusion that they can make moral decisions in certain situations. Neither should we deny that some cognitive and emotional capacities are well within their grasp.

Once, while I was visiting my parents in Florida, my father called his friend Ginger, whose husband had recently died, so that she could show me her new treasure, a teacup poodle, not surprisingly named Tiny, whom she carried inside her shirt. Ginger pampered and loved Tiny, who loved Ginger in return. She brought Ginger much joy in the absence of her husband. But the rules of her condominium complex did not allow dogs on the premises. No matter that this small dog was much less of a nuisance than most of Ginger's human neighbors; because dogs were banned, in order to keep Tiny, Ginger had to move. To our pleasant surprise, my mother, who had been bitten by a dog when she was young and feared dogs throughout her life, allowed Tiny to lie on her lap and smiled from ear to ear as Tiny burrowed into her blanket and heart.

During another visit to my parents, I read about a homeless man named Jackie Tresize who had been mugged and beaten and whose Shih Tzu, "Champion," had disappeared while Jackie was recuperating. Of his canine companion Jackie said, "He was my little family unit; he kept me from feeling lonely. If I had my dog, I wouldn't want nothing else in life."

In my home state, inmates at the Colorado Women's Correctional Facility get to care for and live with dogs who would have been put to sleep at the local animal shelter. The experience of walking the dogs, grooming them, and cleaning up after them is rewarding and beneficial to the dogs, caretakers, and prison staff. Prison Warden Jim Abbott notes, "They have a terrific calming effect that is very therapeutic for both inmates and staff—in a tense situation they divert it." Says Stephanie Timothy, a caretaker of rescued "Charlie": "It helps you feel important that they give you the responsibility. . . . Just knowing [Charlie] is going to make somebody else as happy as he made me is worthwhile." For Mary Johnson, training "Max" taught her a trade she can pursue when she is released. Recently, a dog in Toronto, Canada, was responsible for stopping a man on a killing spree. The dog approached the man and started playing with him, and the man turned himself into the local police!

Animals are intimate and indispensable parts of our spiritual lives. We weave them into numerous aspects of our being—perhaps all parts of our lives—and they are active participants in the vital and life-promoting processes of integration and assimilation. Integration and assimilation beget dynamic and ongoing reciprocal transformations within and between species, resulting in compassion, love, and a heartfelt move toward oneness and wholeness.

Nonhuman animal beings are in a very precarious situation. On the one hand they are used and abused in a sickening and morally repugnant array of human-centered activities. On the other hand they are revered and worshipped and form an indispensable part of the tapestry of our own

well-being: they make us whole, they shape us, and they make us feel good. The interrelationships humans have with their animal kin are complicated.

Animals often are used to define who we humans are in the great chain of being, and that chain is then presented as a hierarchy of beings in which humans place themselves separate from and above other animals. We declare that we are special and better and more valuable than our animal kin and go on to close the door on the lives of other animals. We shut down our senses and our hearts to the idea that we should take them seriously for who they are and not for what we want them to be in our narrow anthropocentric view of the world. Throughout the world the legal standing of the vast majority of animals, if they have any legal standing at all, is that they are property. They can be legally abused, dismissed, disenfranchised, bartered, and killed—treated as if they were backpacks or bicycles. Often this happens in the name of food, science, education, entertainment, or clothing.

If we peer into biological and spiritual mirrors, the reflection shows that it is misleading to present humans and other animals in a we-versus-them framework. While there are many differences, these variations should be cherished rather than used to establish species' boundaries. The multitude of likenesses clearly shows, as mentioned earlier, that we are them and they are us. We are all part of the same deeply interconnected and interdependent community, woven into a seamless tapestry of unity with interconnecting bonds that are reciprocal. I feel blessed when I open myself to the heart, spirit, and soul of other animals. When I study coyotes I am Coyote; when I study birds I am Bird. Often when I stare at a tree, I am Tree. There is a strong sense of oneness. When I watch coyotes I try as hard as I can to adopt a coyote-centric view of the world so that I can come to a deeper understanding and appreciation of these awesome beings.

Every being is defined from within and without. The social matrix in which I am defined is an integrated tapestry, a dynamic event of monumental proportions that resists being totally intelligible given the evolutionary state of my and other humans' brains. My spiritual quest has taken me to the arena in which science, ethology, and spirituality meet. Much of my journey owes itself to my interactions with other animals and their willingness to share their lives with me. Watching a red fox bury another red fox, observing the birth of coyote pups and the tender care provided by parents and helpers, watching dogs blissfully lost in play, and nearly falling over a mountain lion as he protected a deer he had just killed have made me realize how much of "me" is defined by my relationships with others.

Minding Animals

"Minding animals" refers to caring for other animal beings, respecting them for who they are, appreciating their worldviews, and wondering what and

how they feel. It also refers to the fact that many animals have very active and thoughtful minds. I have always minded animals, my parents say, so it is natural for me to do so now. By our minding animals and minding Earth, numerous animals, people, and habitats are far better off than they would be in the absence of an ethic that blends respect, caring, compassion, humility, generosity, kindness, grace, and love.

Caring about some being or some thing—any being or any thing—can spill over into caring for every body and every thing. If we focus on the awe and mystery of other animals and the planet, perhaps we will be less likely to destroy them. Allowing ourselves to sense the presence of other animals brings joy and peace and can foster spiritual development and a sense of unity in which everything on Earth—bodies of water, air, animals, and people—is melded into a seamless and warm comforter of caring and compassion, in which every individual counts and makes a difference. The interconnectedness of individuals in the worldwide community means that what one does affects all. By minding nature we mind ourselves.

Why We Seek Nature's Wisdom and Spirit

Why do we feel good when we are out in nature? I have been asking this question since I was about four years old. A few years ago I discovered the following statement by renowned author Henry Miller: "If we don't always start from Nature we certainly come to her in our hour of need" (1957, 93). Perhaps there is not only one reason why we seek nature's wisdom and spirit when we feel out of balance, when times are tough. Perhaps we can look to our own ancestors and evolution to understand why we do so.

I find that I am never alone and do not feel lonely when I am out in nature.[7] Nature feeds my spirituality, which is based on a deep drive for a sense of unity that is motivated by respect, compassion, humility, generosity, grace, and love. Nature's wisdom easily captures me; I feel safe and calm wrapped in her welcoming arms.

Why do we go to her for guidance? Why do we feel so good, so much at peace, when we see, hear, and smell other animals; when we look at trees or smell the fragrance of flowers; when we watch water in a stream, lake, or ocean? When we are immersed in nature we often cannot articulate why there are such penetrating, calming effects, why we become breathless, why we sigh, why we place a hand over our heart as we sense and feel nature's beauty, mystery, and generosity. Perhaps the feelings evoked are so deep, so primal, that no words are deep or rich enough to convey just what we feel: joy when we know that nature is doing well and deep sorrow and pain when we see nature being exploited or devastated.

There must have been significant consequences for our ancestors when they "fooled" with nature, because they did not have all of the mechanical and intellectual knowhow to undo their intrusions into natural processes.

Indeed, early humans were probably so busy just trying to survive that they did not have the opportunities to wreak the havoc that we have on nature. And the price of their injurious intrusions likely would have been much more serious for them because of their intimate interrelations with, and dependence upon, nature.

It is all too easy to harm environs to which we are not attached or to abuse other beings to whom we are not bonded, to whom we do not feel close. Nonetheless, our psyches, like our ancestors', suffer when nature is harmed. Human beings worldwide commonly lament how bad they feel when they sense nature and her complex webs being spoiled. Ecopsychologists such as Laura Sewall argue just this point. It would be invaluable if we could tune in to our old big brains and let them guide us, for our brains are very much like those of our ancestors. However, our sociocultural milieus, technology, and nature have changed significantly, and we face new and challenging bottlenecks. Our reactions to them move us in new and varied directions. Nature's cycles are still with us and also within us, although we may not be aware of their presence because we so easily can override just about anything "natural." Much technology and busyness cause alienation from nature, and this breach leads to our abuse of nature.

Our brains can distance us from nature, but they also can lead us back to her. Perhaps there is an instinctive drive to have close ties with nature—biophilia, if you will—and when these reciprocal interconnections are threatened or ruptured we seek nature as a remedy, because our old brains still remember the importance of being an integral part of innumerable natural processes and how good these deep interconnections feel. Perhaps our close ancestral ties with nature offer a reason for being optimistic about healing deeply wounded nature, because it just does not feel good to cause harm to nature.

Perhaps the joy we feel when nature is healthy and when we are embedded in nature's mysterious ways and complicated webs is but one measure of the deep love we have for her—a love that offers us another chance to change our ways, a love that may awaken us from a dangerous apathy that amounts to the betrayal of our collective responsibility to act proactively and with passion to save nature for our and future generations. Activism, whether it involves calling attention to our destructive ways or conducting research that can be used to right wrongs, can be healing for us and nature and is but one way for us to return to nature some of the wisdom, solace, and spirit she provides, to allow her to continue to exist for all to relish.

In the current state of the world, personal transformations are greatly needed. We owe it to future generations to transcend the present, to share dreams for a better world, to step lightly, to move cautiously and with restraint. We all can be dreamers and doers. We owe it to ourselves and to the other animals to whom we can, unfortunately, do whatever we choose. We owe it to ourselves to keep in mind the power of love. As big-brained,

omnipresent, powerful, and supposedly omniscient mammals, we are the most powerful beings on Earth. With that might comes inextricably tied innumerable, staggering responsibilities to be ethical human beings.

Animals are always near. As the enterprise of science adopts more heart and compassion and turns away from tiresome objectivity, which misleads us, and as we learn more about the deep and rich emotional lives of animals, their presence—even if we do not know that they are there—can affect our own spirituality and foster deep feelings of oneness and wholeness. Animals are present in heart and spirit even when they are not immediately present in body. Even in the absence of the kaleidoscope of cues they directly provide, even when we cannot actually see animals, they may be present in voice and odor, sounds and smells, that remind us how near they are.

In many ways we need animals more than they need us. In our absence most animals will go on to live quite contentedly. But our hearts and spirits erode when we abuse other animals, because they are an essential part of who we are. When we pillage Earth we destroy the deep and reciprocal interconnections that define all life, the interrelationships that resonate in all beings and all things. When we desecrate Earth an eerie coldness prevails, for when we slay nature we kill ourselves, other animals, plants, landscapes, and the ubiquitous universal spirit that connects us all.

Hope for the Future

While it sometimes seems as though we are bent on destroying the very animals and landscapes we love, there is hope. I am a hopeful dreamer, a diehard optimist. We must stroll with our kin and not leave them in our tumultuous wake of rampant, self-serving destruction. If love rules, we can win—but time is not on our side. There really is a sense of urgency. If each of us does something to make Earth a better place for all beings and things, we will create a path for future generations so that they, too, will be able to enjoy the many wondrous gifts of nature.

I ask people to imagine that they carry a suitcase of courage, compassion, and hope and that the supply will never be exhausted. If love is poured out in abundance, it will be returned in abundance. There is no need to fear depleting the potent and self-reinforcing feeling of love that continuously can serve as a powerful stimulant for generating compassion, respect, and more love for all life. Each individual plays an essential role, and that individual's spirit and love are intertwined with the spirit and love of others. These interrelationships, which transcend individuals' embodied selves, foster a sense of oneness. They can work in harmony to make this a better and more compassionate world for all beings. It is easy to have one's spirit weathered by the bad things that happen all around us. But many good things also happen every day that can energize our spirit and impel us to act.

We must replace our mindlessness about our interactions with animals and Earth with mindfulness. Nothing will be lost, and much will be gained. We can never be too generous or too kind. We will come to feel better about ourselves if we know that we did the best we could and took into account the well-being of the magnificent animals with whom we share Earth, the awesome and magical beings who make our lives richer, more challenging, and more enjoyable than they would be otherwise. We must do better than our ancestors did, and we certainly have the resources to do so. Will enough of us choose to make the heartfelt commitment to making this a better world, a more compassionate world in which love is plentiful and shared, before it is too late? I believe that we have already embarked on this pilgrimage.

In October 2000 a symposium took place at the Smithsonian Institution to celebrate the publication of *The Smile of a Dolphin*, a book about animal emotions that I edited. Cynthia Moss, who has studied wild elephants for almost four decades, talked about and showed video of these highly intelligent and emotional beasts. During the question-and-answer period a former program leader from the National Science Foundation asked Cynthia, "How do you know these animals are feeling the emotions you claim they are?" to which Cynthia replied, "How do you know they're not?"

Of course, he could not answer his own question with certainty, and neither could Cynthia. However, science sense, along with common sense and solid evolutionary biology, favors her view over his. Mainstream journals are publishing essays on animal emotions. Recent examples include "Elephant Breakdown" (Bradshaw et al. 2005), an article about social trauma in elephants, which recently appeared in *Nature*, and the *New York Times* editorial "My Little Chickadee" (*New York Times* 2005) about our connections to nature.[8]

We need a paradigm shift in how we study animal emotions and animal sentience and what we do with what we "know" and feel about animal emotions and animal sentience. Historical momentum in methodology and in interpretation and explanation need to be reassessed critically. We also need to change funding priorities by not buying into the *zeitgeist* of "science over all."

I am personally appalled at how humans abuse animals. Future generations will look back on us with shock and horror at our treatment of other animal beings and wonder how we missed what is so obvious about animal emotions. How could we ever do the things that we did? How could we ever allow so many animal beings to suffer horrific pain just so that we could study them or eat them?

We need to make the world a better place for all beings. As I said previously, I believe that good- or right-minded people can do and/or allow horrible things to be done to animals because they have not traveled deep

into their hearts or because they just don't know what we know. We need to educate them, and that is something we can do.

I often imagine a dinner-table conversation between a scientist parent and his or her child concerning, say, experiments in which the nature of mother-infant bonds are studied by taking infants away from their mother.

Child: So, what did you do today?
Parent: Oh, I removed two baby chimpanzees from their mother to see how they reacted to this treatment.
Child: Hmm . . . do you think the baby minded being taken from her mother?
Parent: Well, I'm not sure, so that's why I did it.
Child: Oh, but what do you think that the baby's fighting to get back to her mother and her writhing and screaming meant? Surely she didn't like it. We already knew that, didn't we? Why do you do this to young animals and their mom?
Parent: It's getting late, isn't it time for bed?

This sort of conversation could be imagined for innumerable situations in which we subject animal beings to deep and enduring suffering, including the use of animals for food (CIWF 2005). There is no reason to do much of the harmful research that is done these days. I hope that my scientific colleagues and I can make a difference in the lives of all animals subjected to such treatment. We must learn from the horrific research that has occurred in the past, such as maternal-deprivation studies in monkeys (Blum 2002), and not allow it to happen again.

We are fragmented because of our alienation from animals and nature. As we come to live more in harmony with nature, we can restore, rekindle, and recreate ourselves. We need animals, nature, and wildness. We need their spirit.

NOTE

I thank Paul Waldau for organizing the session on the implications of my work at the American Academy of Religion session in San Antonio, Texas, in November 2004, and I thank Graham Harvey, Nancy Howell, Jay McDaniel, and Donna Yarri for taking the time to read my material and to write excellent and penetrating essays. Jan Nystrom provided fine editorial advice, as usual (but I didn't always take it!). Some of this essay is excerpted from Bekoff 2006 and Bekoff in press. I dedicate this essay to the memory of Tina Nelson, who was the Executive Director of the American Anti-Vivisection Society from 1995 until her death on October 19, 2005. Tina worked long and hard to make this a better world for all animals, and she will be sorely missed.

1. Science and the Spiritual Quest II; American Association for the Advancement of Science program on Science, Ethics, and Religion (Sussman and Chapman 2004); Jeffrey Schloss's wonderful interdisciplinary discussion group on Nature in Belief held at Calvin College in July 2004; see also Clayton and Schloss 2004.
2. For an account of Rome's ban on goldfish bowls see *http://www.cnn.com/2005/WORLD/europe/10/25/italy.fishbowls.reut/index.html.*
3. In what became known as the McLibel case (*http://en.wikipedia.org/wiki/Helen_Steel*), Helen Steel and David Morris sued McDonald's Restaurants and won on a number of issues.

4. For more on this, see some of my recent essays and books (Allen and Bekoff 1997; Bekoff 2000a, b, c; 2002a; 2003; 2004; 2006; in press; Bekoff and Nystrom 2004; Bekoff and Sherman 2004; Goodall and Bekoff 2002).

5. I met Lorenz at an ethological conference held in Parma, Italy, and his passion and enthusiasm were incredibly contagious. For hours he never repeated a story of the animals with whom he had shared his home. He clearly loved what he did and loved his animal friends who brought so much to his life.

6. In view of this sort of inconsistency, it is important to note that the AZA itself states, "Little to no systematic research has been conducted on the impact of visits to zoos and aquariums on visitor conservation knowledge, awareness, affect, or behavior" (AZA Executive summary). So much for their claims that zoos are important for purposes of education and conservation, and so much for the selected use of anthropomorphism.

7. Much of what follows is from Bekoff 2003.

8. The elephant is often the poster child for discussions of animal emotions. Elephants form social groups called matriarchies, and individuals of different ages and sizes form very close social bonds with one another. Elephants experience a wide range of emotions ranging from joy to grief. They also empathize with others. Joyce Poole, a seasoned expert in elephant behavior, wrote about a mother who had lost her newborn: "As I watched Tonie's vigil over her dead newborn, I got my first very strong feeling that elephants grieve. I will never forget the expression on her face, her eyes, her mouth, the way she carried her ears, her head, and her body. Every part of her spelled grief" (1998, 90). Poole also wrote: "It is hard to watch elephants' remarkable behavior during a family or bond group greeting ceremony, the birth of a new family member, a playful interaction, the mating of a relative, the rescue of a family member, or the arrival of a musth male, and not imagine that they feel very strong emotions which could be best described by words such as joy, happiness, love, feelings of friendship, exuberance, amusement, pleasure, compassion, relief, and respect" (1998, 90–91). I had the pleasure of visiting Iain Douglas-Hamilton and his colleagues who were studying elephants in the Samburu Reserve in Northern Kenya in July 2005 and was amazed by my own experience of the deep emotional lives of these magnificent animals who form extremely close social bonds with other group members.

References

Allen, C., and Marc Bekoff. 1997. *Species of Mind: The Philosophy and Biology of Cognitive Ethology.* Cambridge: MIT Press.

Appel, A. 2005. Chimp "Dinner Conversation" Proof of Ape Speech? *http://news.nationalgeographic.com/news/2005/10/1020_051020_chimps_talk.html.*

AZA (American Zoo and Aquarium Association), Executive summary: Visitor learning in zoos and aquariums. *http://www.aza.org/ConEd/VisitorLearning/Documents/VisitorLearningExecutiveSummary.pdf.*

Bekoff, M., ed. 2000a. *The Smile of a Dolphin: Remarkable Accounts of Animal Emotions.* Washington, D.C.: Random House/Discovery Books.

Bekoff, Marc. 2000b. "Animal Emotions: Exploring Passionate Natures." *BioScience* 50:861–70.

———. 2000c. *Strolling with Our Kin: Speaking for and Respecting Voiceless Animals.* New York: Lantern Books.

———. 2001. "Observations of Scent-marking and Discriminating Self from Others by a Domestic Dog (*Canis familiaris*): Tales of Displaced Yellow Snow." *Behavioural Processes* 55:75–79.

———. 2002a. *Minding Animals: Awareness, Emotions, and Heart*. New York: Oxford Univ. Press.

———. 2002b. "Animal Reflections." *Nature* 419:255.

———. 2003. "Minding Animals, Minding Earth: Old Brains in New Bottlenecks." *Zygon*: *Journal of Religion and Science* 38 (December): 911–41.

———. 2004. "Wild Justice and Fair Play: Cooperation, Forgiveness, and Morality in Animals." *Biology & Philosophy* 19:489–520.

———. 2006. *Animal Passions and Beastly Virtues: Reflections on Redecorating Nature*. Philadelphia: Temple Univ. Press.

———. In press. "Animal Emotions and Animal Sentience and Why They Matter: Blending 'Science Sense' with Common Sense, Compassion and Heart." In *Animals, Ethics, and Trade*, ed. Jacky Turner and Joyce D'Silva. Earthscan Publishing.
Bekoff, Marc, and C. Allen. 1997. "Cognitive Ethology: Slayers, Skeptics, and Proponents." In *Anthropomorphism, Anecdote, and Animals: The Emperor's New Clothes?* ed. R. W. Mitchell, N. Thompson, and L. Miles, 313–34. Albany: State Univ. of New York Press.
Bekoff, Marc, C. Allen, and G. Burghardt, eds. 2002. *The Cognitive Animal: Empirical and Theoretical Perspectives on Animal Cognition.* Cambridge: MIT Press.
Bekoff, Marc, and Jan Nystrom. 2004. "The Other Side of Silence: Rachel Carson's Views of Animals. *Zygon*: *Journal of Religion and Science* 39 (December): 861–83.
Bekoff, Marc, and P. Sherman. 2004. "Reflections on Animal Selves." *Trends in Ecology and Evolution* 19:176–80.
Bentham, Jeremy. [1789] 1996. *Introduction to the Principles of Morals and Legislation.* New York: Oxford Univ. Press..
Berridge, K. 2003. "Comparing the Emotional Brains of Humans and Other Animals." In *Handbook of Affective Sciences*, ed. R. J. Davidson, K. R. Scherer, and H. H. Goldsmith, 25–51. New York: Oxford Univ. Press.
Blum, D. 2002. *Love at Goon Park: Harry Harlow and the Science of Affection.* Cambridge, Mass.: Perseus.
Bradshaw, G. A., et al. 2005. "Elephant Breakdown." *Nature* 433:807.
Bshary, R., W. Wickler, and H. Fricke. 2002. "Fish Cognition: A Primate's Eye View." *Animal Cognition* 5:1–13.
CIWF. 2005. From Darwin to Dawkins: The Science and Implications of Animal Sentience (international conference). *http://www.ciwf.org/conference2005; http://www.ciwf.org.uk/education/international.html.*
Clayton, P., and J. Schloss, eds. 2004. *Evolution and Ethics: Human Morality in Biological and Religious Perspective*. Grand Rapids, Mich.: Wm. B. Eerdmans.
Couturier, L. 2005. *The Hopes of Snakes and Other Tales from the Urban Landscape*. Boston: Beacon.
Crace, John. 2005. "Mary Midgley: Moral Missionary." *The Guardian,* 20 September.
Dalai Lama. 2005. *The Universe in a Single Atom: The Convergence of Science and Spirituality*. New York: Morgan Road Books.
Darwin, Charles. [1871] 1936. *The Descent of Man and Selection in Relation to Sex*. New York: Random House.
———. [1872] 1998. *The Expression of the Emotions in Man and Animals.* 3d ed., with Introduction, Afterword, and Commentaries by Paul Ekman. New York: Oxford Univ. Press.
de Waal, Frans B. M. 1999. "Cultural Primatology Comes of Age." *Nature* 399:637–38.
———. 2001. *The Ape and the Sushi Master.* New York: Basic Books.
———. 2005. *Our Inner Ape*. New York: Riverhead Books.
Goodall, Jane. 1990. *Through a Window: My Thirty Years with the Chimpanzees of Gombe.* Boston: Houghton Mifflin.
———. 2005. *Harvest for Hope: A Guide to Mindful Eating.* New York: Warner Books.
Goodall, Jane, and Marc Bekoff. 2002. *The Ten Trusts: What We Must Do to Care for the Animals We Love*. San Francisco: HarperCollins.
Griffin, Donald R. 2001. *Animal Minds*. Chicago: Univ. of Chicago Press.
Gould, Stephen J. 2000. "A Lover's Quarrel." In *The Smile of a Dolphin: Remarkable Accounts of Animal Emotions*, ed. Marc Bekoff, 13–17. Washington, D.C.: Random House/Discovery Books.
Haraway, Donna. 2003. *The Companion Species Manifesto: Dogs, People, and Significant Otherness.* Chicago: Prickly Paradigm Press.
Harvey, Graham. 2006. "Animals, Animists, and Academics." *Zygon: Journal of Religion and Science* 41 (March): 9–19.
Holy, T. E., and Z. Guo. 2005. "Ultrasonic Songs of Male Mice." *PloS (Public Library of Science) Biology* 3:1–10.
Howell, Nancy. 2006. "'Going to the Dogs': Canid Ethology and Theological Reflection." *Zygon: Journal of Religion and Science* 41 (March): 59–69.
Kaminski, J., J. Call, and J. Fischer. 2004. "Word Learning in a Domestic Dog: Evidence for 'Fast Mapping.'" *Science* 304:1682–83.

Kurlansky, M. 2005. *1968: The Year that Rocked the World*. New York: Random House.
Leake, Jonathan. 2005. "The Secret Life of Moody Cows." *The Sunday Times*. *http://www.timesonline.co.uk/article/0,,2087–1502933,00.html.*
Leopold, Aldo. 1948. *A Sand Country Almanac*. New York: Oxford Univ. Press.
Long, W. J. 1906. *Brier-patch Philosophy by "Peter Rabbit."* Boston: Ginn and Company.
Lorenz, Konrad. 1991. *Here I Am—Where Are You?* New York: Harcourt, Brace, and Jovanovich.
McComb, K., L. Baker, and C. Moss. 2005. "African Elephants Show High Levels of Interest in the Skulls and Ivory of Their Own Species." *Biology Letters*. *http://www.elephantvoices.org/why_comm/McComb.pdf.*
McDaniel, Jay. 2006. "All Animals Matter: Marc Bekoff's Contribution to Constructive Christian Theology." *Zygon: Journal of Religion and Science* 41 (March): 29–57.
McRae, M. 2000. "Central Africa's Orphaned Gorillas: Will They Survive the Wild?" *National Geographic* (February): 86–97.
Meir, E., S. Andelman, and H. P. Possingham. 2004. "Does Conservation Planning Matter in a Dynamic and Uncertain World?" *Ecology Letters* 7:615–22.
Miller, Henry. 1957. *Big Sur and the Oranges of Hieronymus Bosch.* New York: New Directions.
Mott, M. 2005. "Dogs Used as Shark Bait on French Island." *http://news.nationalgeographic.com/news/2005/10/1019_051019_dogs_sharks.html.*
Oliver, Mary. 1992. *New and Selected Poems.* Boston: Beacon.
New York Times. 2005. "My Little Chickadee." Editorial, 3 March. *http://www.nytimes.com/2005/03/03/opinion/03thu4.html.*
Panksepp. J. 2005a. "Beyond a Joke: From Animal Laughter to Human Joy." *Science* 308:62–63. Also at *http://news.bbc.co.uk/2/hi/science/nature/4401695.stm.*
———. 2005b. "Affective Consciousness: Core Emotional Feelings in Animals and Humans." *Consciousness and Cognition* 14:30–80.
Papineau, D. 2005. "Looking Ahead to Future Brain Studies." Review of *The New Brain Sciences: Perils and Prospects*, ed. D. Rees and S. Rose. *Nature* 433:803.
Poole, J. 1998. "An Exploration of a Commonality between Ourselves and Elephants." *Etica & Animali* (September), 85–110.
Preston, S. D., and F. B. M. de Waal. 2002. "Empathy: Its Ultimate and Proximate Bases." *Behavioral and Brain Sciences* 25:1–72.
Rollin, B. E. [1989] 1998. *The Unheeded Cry: Animal Consciousness, Animal Pain and Science*. Ames: Iowa State Univ. Press.
Rothenberg, D. 2005. *Why Birds Sing: A Journey through the Mystery of Birdsong*. New York: Basic Books.
Saunders, C. D. 2003. "The Emerging Field of Conservation Psychology." *Human Ecology Review* 10:137–49.
Schloss, J. 2005. Nature in Belief: Evolutionary Explanation, Biological Function, and Religious Purpose. Calvin College Seminar in Christian Scholarship. *http://www.calvin.edu/scs/2004/seminars/templeton.*
"Settling Doubts about Livestock Stress." 2005. *Agricultural Research* (March), *http://www.ars.usda.gov/is/AR/archive/mar05/stress0305.htm.*
Sharpe, L. 2005. *Creatures Like Us?* Exeter, U.K.: Imprint Academic.
Skutch, A. 1996. *The Minds of Birds*. College Station: Texas A&M Univ. Press.
Smith, Doug W. 2005. "Meet Five, Nine, and Fourteen, Yellowstone's Heroine Wolves." *Wildlife Conservation* (February), 28–33.
Sneddon, L. U. 2003. "The Evidence for Pain in Fish: The Use of Morphine as an Analgesic." *Applied Animal Behaviour Science* 83:153–62.
Sussman, R., and A. R. Chapman, eds. 2004. *The Origins and Nature of Sociality*. Chicago: de Gruyter.
Vining, Joanne. 2003. "The Connection to Other Animals and Caring for Nature." *Human Ecology Review* 10:87–99.
Vuilleumier, P. 2005. "Staring Fear in the Face." *Nature* 433:22–23.
Warden, C. J., and L. H. Warner. 1928. "The Sensory Capacities and Intelligence of Dogs, with a Report on the Ability of the Noted Dog 'Fellow' to Respond to Verbal Stimuli." *Quarterly Review of Biology* 3:1–28.

Whitehead, H. 2003. *Sperm Whales: Social Evolution in the Oceans*. Chicago: Univ. of Chicago Press.
Whiten, A., et al. 1999. "Cultures in Chimpanzees." *Nature* 399:682–85.
"Wild Gorillas Seen to Use Tools." 2005. *http://news.bbc.co.uk/2/hi/science/nature/4296606.stm*.
Wrangham, R., and N. Conklin-Brittain. 2003. "Cooking as a Biological Trait." *Comparative Biochemistry and Physiology,* Part A 136:35–46.
Wynne, Clive D. L. 2004a. *Do Animals Think?* Princeton, N.J.: Princeton Univ. Press.
———. 2004b. "The Perils of Anthropomorphism." *Nature* 428:606.
———. 2004c. "Fair Refusal by Capuchin Monkeys." *Nature* 428:140.
Yarri, Donna. 2005. *The Ethics of Animal Experimentation: A Critical Analysis and Constructive Christian Proposal*. New York: Oxford Univ. Press.
———. 2006. "Animals as Kin: The Religious Significance of Marc Bekoff's Work." *Zygon: Journal of Religion and Science* 41 (March): 21–28.