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## **Animal Consciousness<sup>1</sup>**

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There are the many reasons besides sheer fascination with animals to be interested in animal consciousness. First, one way in which we, as humans, may seek to understand ourselves is to compare and contrast ourselves with whatever in nature is most similar to us, i.e., other animals. Second, the problem of determining the nature of animal consciousness raises challenging questions about the limits of knowledge and scientific methodology. Third, animal consciousness is of considerable moral significance given the dependence of modern societies on mass farming and the use of animals for biomedical research, education, and entertainment. Fourth, while general theories of consciousness are frequently developed without special regard to questions about animal consciousness, the plausibility of such theories can be tested against the results of their application to animals.

Questions about animal consciousness are just one corner of a more general set of questions about animal cognition and mind. The so-called "cognitive revolution" that took place during the latter half of the 20th century has led to many innovative experiments by comparative psychologists and ethologists probing the cognitive capacities of animals. Despite all this work, the topic of consciousness per se in animals has remained controversial, even taboo, among

many scientists, even while it remains a matter of common sense to most people that many other animals do have conscious experiences.

## **Concepts of Consciousness**

In discussions of animal consciousness there is no clearly agreed upon sense in which the term "consciousness" is used. Having origins in folk psychology, "consciousness" has a multitude of uses that may not be resolvable into a single, coherent concept (Wilkes 1984). Nevertheless, several useful distinctions among different notions of consciousness have been made, and with the help of these distinctions it is possible to gain some clarity on the important questions that remain about animal consciousness.

Two ordinary senses of consciousness that are not in dispute when applied to animals are the sense of consciousness involved when a creature is awake rather than asleep, or in a coma, and the sense of consciousness implicated in the basic ability of organisms to perceive and thereby respond to selected features of their environments, thus making them conscious or aware of those features. Consciousness in both these senses is identifiable in organisms belong to a wide variety of taxonomic groups.

A third, more technical notion of consciousness, *access consciousness*, has been introduced by Block (1995) to capture the sense in which mental representations may be poised for use in rational control of action or speech. Block himself believes that many animals possess access consciousness (he does not make speech a requirement), but clearly an author such as Descartes, who, we will see, denied speech and language to animals, would also deny access consciousness to them. Those who follow Davidson (1975) in denying intentional states to

animals would likely concur.

Two additional senses of consciousness that cause controversy when applied to animals are *phenomenal consciousness* and *self-consciousness*.

*Phenomenal consciousness* refers to the qualitative, subjective, experiential, or phenomenological aspects of conscious experience, sometimes identified with qualia. (In this article we also use the term "sentience" to refer to phenomenal consciousness.) To contemplate animal consciousness in this sense is to consider the possibility that, in Nagel's (1974) phrase, there might be "something it is like" to be a member of another species. Nagel disputes our capacity to know, imagine, or describe in scientific (objective) terms what it is like to be a bat, but he assumes that there is something it is like. There are those, however, who would challenge this assumption directly. Others would less directly challenge the possibility of scientifically investigating its truth. Nevertheless, there is broad commonsense agreement that phenomenal consciousness is more likely in mammals and birds than it is in invertebrates, such as insects, crustaceans or molluscs (with the possible exception of some cephalopods), while reptiles, amphibians, and fish constitute an enormous grey area.

*Self-consciousness* usually refers to an organism's capacity for second-order representation of the organism's own mental states. Because of its second-order character ("thought about thought") the capacity for self-consciousness is closely related to questions about "theory of mind" in nonhuman animals -- whether any animals are capable of attributing mental states to others. Questions about self-consciousness and theory of mind in animals are a matter of active scientific controversy, with the most attention focused on chimpanzees and to a more limited extent on the other great apes. As attested by this controversy (and unlike questions

about animal sentience) questions about self-consciousness in animals are commonly regarded as tractable by empirical means.

The bulk of this article deals primarily with the attribution of consciousness in its phenomenal sense to animals. However, because one of the most sustained attacks on the notion of phenomenal consciousness (Carruthers 1998a,b, 2000) invokes the absence of "theory of mind" capacities that have been linked to self-consciousness, the next section provides some background on this topic.

### **Self-consciousness**

The systematic study of self-consciousness and theory of mind in nonhuman animals has its roots in an approach to the study of self-consciousness pioneered by Gallup (1970). It was long known that chimpanzees would use mirrors to inspect their images, but Gallup developed a protocol that appears to allow a scientific determination of whether it is merely the mirror image per se that is the object of interest to the animal inspecting it, or whether it is the mirror image qua proxy for the animal itself that is the object of interest. Gallup's protocol has been repeated with other great apes and some monkey species, but chimpanzees and orang utans are the only primate species who consistently "pass" the test. Reiss & Marino (2001) have recently provided positive evidence of mirror self-recognition in two bottlenose dolphins.

According to Gallup et al. (2002) "Mirror self-recognition is an indicator of self-awareness." Furthermore, he claims that "the ability to infer the existence of mental states in others (known as theory of mind, or mental state attribution) is a byproduct of being self-aware." He describes the connection between self-awareness and theory of mind thus: "If you are self-aware then

you are in a position to use your experience to model the existence of comparable processes in others." A full assessment of Gallup's reasoning cannot be provided here, but the chapters in Parker et al. (1994) and Heyes (1998) cover much of the debate (see also Shumaker & Schwartz 2003).

The theory of mind debate has origins in the hypothesis that primate intelligence in general, and human intelligence in particular, is specially adapted for social cognition (see Byrne & Whiten 1988, especially the first two chapters, by Jolly and Humphrey). Consequently, it has been argued that evidence for the ability to attribute mental states in a wide range of species might be better sought in natural activities such as social play, rather than in laboratory designed experiments that place the animals in artificial situations (Allen & Bekoff 1997; see esp. chapter 6; see also Hare et al. 2000, Hare et al. 2001, and Hare & Wrangham 2002). Furthermore, it is quite possible that the mirror test is not an appropriate test for theory of mind in most species because of its specific dependence on the ability to match motor to visual information, a skill that may not have needed to evolve in a majority of species, e.g., those species that depend more on chemical or auditory cues.

Along similar lines, Bekoff & Sherman (2004) develop three categories (or degrees) of "self-cognizance" -- a phrase they introduce to standardize terminology and to cover a continuum from "self-referencing" (a non-cognitive capacity for perceptual discrimination of self and other) to self-consciousness. They suggest a broader perspective on self-consciousness should include "body consciousness" and a sense of possession -- "mine-ness" ("my body", "my territory"). These are features that could lead to empirical studies that are more relevant to species' evolved capacities. Alternative approaches that have attempted to provide strong evidence of theory of mind in nonhuman animals under natural conditions have generally failed

to produce such evidence (e.g., the conclusions of Cheney & Seyfarth 1990), although anecdotal evidence tantalizingly suggests that researchers still have not managed to devise the right experiments.

### **Phenomenal Consciousness: Basic Questions -- Epistemological and Ontological**

Among philosophers of mind, the topic of consciousness in nonhuman animals has been primarily of epistemological interest. Two central questions are:

- Can we know which animals beside humans are conscious? (The Distribution Question)
- Can we know what, if anything, the experiences of animals are like? (The Phenomenological Question)

In his seminal paper "What is it like to be a bat?" Thomas Nagel (1974) simply assumes that there is something that it is like to be a bat, and focuses his attention on what he argues is the scientifically intractable problem of knowing what it is like. Nagel's confidence in the existence of conscious bat experiences would generally be held to be the commonsense view, but there are those who would argue that the Distribution Question is just as intractable as the Phenomenological Question.

The two questions might be seen as special cases of the general skeptical "problem of other minds", which even if intractable is nevertheless generally ignored to good effect by psychologists. However, it is often thought that knowledge of animal minds -- what Allen & Bekoff (1997) refer to as "the other species of mind problem" -- presents special methodological problems because animals cannot be interrogated directly about their

experiences (but see Sober 2000 for an alternative approach to tractability within an evolutionary framework). Although there have been attempts to teach human-like languages to members of other species, none has reached a level of conversational ability that would solve this problem directly. Furthermore, except for some language-related work with parrots and dolphins, such approaches are generally limited to those animals most like ourselves, particularly the great apes. But there is great interest in possible forms of consciousness in a much wider variety of species than are suitable for such research, both in connection with questions about the ethical treatment of animals (e.g., Singer 1975/1990; Regan 1983; Rollin 1989; Varner 1999), and in connection with questions about the natural history of consciousness (Griffin 1976, 1984, 1992; Griffin & Speck 2004; Bekoff 2002; Bekoff et al. 2002).

Griffin's agenda for the discipline he labeled "cognitive ethology" features the topic of animal consciousness and advocates a methodology, inherited from classical ethology, that is based in naturalistic observations of animal behavior (see Allen 2004a). This agenda has been strongly criticized, with his methodological suggestions often dismissed as anthropomorphic (see Bekoff & Allen 1997 for a survey). But such criticisms may have overestimated the dangers of anthropomorphism (Fisher 1990; Keeley 2004) and many of the critics themselves rely on claims for which there are scant scientific data (e.g., Kennedy 1992, who claims that the "sin" of anthropomorphism may be programmed into humans genetically).

While epistemological and related methodological issues have been at the forefront of discussions about animal consciousness, the main wave of more general recent philosophical attention to consciousness has been focused on ontological questions about the nature of phenomenal consciousness. One might reasonably think that the question of what

consciousness is should be settled prior to tackling the Distribution Question -- that ontology should drive the epistemology. In an ideal world this order of proceeding might be the preferred one, but as we shall see in the next section, the current state of disarray among the ontological theories makes such an approach untenable.

## **Applying Ontological Theories**

### **Non-reductive accounts**

Whether because they are traditional dualists, or because they think that (phenomenal) consciousness is an as-yet-undescribed fundamental constituent of the physical universe, some theorists maintain that consciousness is not explainable in familiar scientific terms. Such non-reductive accounts of consciousness (with the possible exception of those based in anthropocentric theology) provide no principled ontological reasons, however, for doubting that animals are conscious. Cartesian dualism is, of course, traditionally associated with the view that animals lack minds. But Descartes' argument for this view was not based on any ontological principles, but upon what he took to be the failure of animals to use language conversationally or reason generally. On this basis he claimed that nothing in animal behavior requires a non-mechanical (mental) explanation; hence he saw no reason to attribute possession of mind to animals.

There is, however, no ontological reason why animal bodies are any less suitable vehicles for embodying a Cartesian mind than are human bodies. Hence dualism itself does not preclude animal minds. Similarly, more recent non-reductive accounts of consciousness in terms of fundamental properties are quite compatible with the idea of animal consciousness. None of



these accounts provides any constitutional reason why those fundamental properties should not be located in animals. Furthermore, given that none of these theories specify empirical means for detecting the right stuff for consciousness, and indeed dualist theories cannot do so, they seem forced to rely upon behavioral criteria rather than ontological criteria for the deciding the Distribution Question.

### **Reductive accounts**

Other theorists have tried to give reductive accounts of (phenomenal) consciousness in terms either of the physical, biochemical, or neurological properties of nervous systems (physicalist accounts) or in terms of other cognitive processes (functionalist-reductive accounts).

Physicalist accounts of (phenomenal) consciousness, which identify it with physical or physiological properties of neurons, do not provide any particular obstacles to attributing consciousness to animals, given that animals and humans share the same basic biology. Of course there is no consensus about which physical or neurological properties are to be identified with consciousness. But if it could be determined that phenomenal consciousness was identical to a property such as quantum coherence in the microtubules of neurons, or brain waves of a specific frequency, then settling the Distribution Question would be a straightforward empirical matter of establishing whether or not members of other species possess the specified properties.

Functionalism-reductive accounts have sought to explain consciousness in terms of other cognitive processes. Some of these accounts identify phenomenal consciousness with the (first-order) representational properties of mental states. Such accounts are generally quite

friendly to attributions of consciousness to animals, for it is relatively uncontroversial that animals have internal states that have the requisite representational properties, e.g. Dretske's (1995) claim that phenomenal consciousness is inseparable from a creature's capacity to perceive and respond to features of its environment. Likewise, Tye (2000) argues, based upon his first-order representational account of phenomenal consciousness, that it extends even to honeybees.

Functionalist theories of phenomenal consciousness that rely on more elaborately structured cognitive capacities can be less accommodating to the belief that animals do have conscious mental states. For example, some twentieth century philosophers, while rejecting Cartesian dualism, have turned his epistemological reliance upon language as an indicator of consciousness into an ontological point about the essential involvement of linguistic processing in human consciousness. Such insistence on the importance of language for consciousness underwrites the tendency of philosophers such as Dennett (1969, 1995, 1997) to deny that animals are conscious in anything like the same sense that humans are (see also Carruthers 1996).

For Carruthers (1998a,b, 2000) the issue is not language but the capacity for higher-order thought (thoughts about thoughts), sometimes called "theory of mind". According to Carruthers, a mental state is phenomenally conscious for a subject just in case it is available to be thought about directly by that subject. Furthermore, according to Carruthers, such higher-order thoughts are not possible unless a creature has a "theory of mind" to provide it with the concepts necessary for thought about mental states. But, Carruthers argues, there is little, if any, scientific support for theory of mind in nonhuman animals, even among the great apes (with the possible exception of chimpanzees), so he concludes that there is little support either

for the view that any animals possess phenomenological consciousness.

In contrast to Carruthers' higher-order thought account of sentience, other theorists such as Armstrong (1980), and Lycan (1996) have preferred a higher-order experience account, where consciousness is explained in terms of inner perception of mental states, a view that can be traced back to Aristotle, and also to John Locke. Because such models do not require the ability to conceptualize mental states, proponents of higher-order experience theories have been slightly more inclined than higher-order theorists to allow that such abilities may be found in other animals.

### **Limits of ontology**

It is beyond the scope of this article to survey the strong attacks that have been mounted against the various accounts of consciousness, but it is safe to say that none of them seems secure enough to hang a decisive endorsement or denial of animal consciousness upon it. Accounts of consciousness in terms of basic neurophysiological properties, the quantum-mechanical properties of neurons, or *sui generis* properties of the universe are just as insecure as the various functionalist accounts. And even those ontological accounts that are, in general outline, compatible with animal sentience are not specific enough to permit ready answers to the Distribution Question. Hence no firm conclusions about the distribution of consciousness can be drawn on the basis of the work to date by philosophers on the ontology of consciousness.

Where does this leave the epistemological questions about animal consciousness? While it may seem natural to think that we must have a theory of what consciousness is before we try

to determine whether other animals have it, this may in fact be putting the conceptual cart before the empirical horse. In the early stages of the scientific investigation of any phenomenon, putative samples must be identified by rough rules of thumb (or working definitions) rather than complete theories. Early scientists identified gold by contingent characteristics rather than its atomic essence, knowledge of which had to await thorough investigation of many putative examples -- some of which turned out to be gold and some not. Likewise, at this stage of the game, perhaps the study of animal consciousness would benefit from the identification of animal traits worthy of further investigation, with no firm commitment to idea that all these examples will involve conscious experience.

Of course, as a part of this process some reasons must be given for identifying specific animal traits as "interesting" for the study of consciousness, and in a weak sense such reasons will constitute an argument for attributing consciousness to the animals possessing those traits. These reasons can be evaluated even in the absence of an accepted ontology for consciousness. Furthermore, those who would bring animal consciousness into the scientific fold in this way must also explain how scientific methodology is adequate to the task in the face of various arguments that it is inadequate. These arguments, and the response to them, can also be evaluated in the absence of ontological certitude. Thus there is plenty to cover in the rest of this article.

## **Evaluation of Arguments Against Animal Consciousness**

### **Similarity arguments**

One kind of strategy that has been used to deny animal consciousness is to focus on certain

similarities between animal behaviors and behaviors that may be conducted unconsciously by humans. Thus, for example, Carruthers (1989, 1992) argued that all animal behavior can be assimilated to the non-conscious activities of humans, such as driving while distracted ("on autopilot"), or to the capacities of "blindsight" patients whose damage to visual cortex leaves them phenomenologically blind in a portion of their visual fields (a "scotoma") but nonetheless able to identify things presented to the scotoma. (He refers to both of these as examples of "unconscious experiences".)

This comparison of animal behavior to the unconscious capacities of humans can be criticized on the grounds that, like Descartes' pronouncements on parrots, it is based only on unsystematic observation of animal behavior. There are grounds for thinking that careful investigation would reveal that there is not a very close analogy between animal behavior and human behaviors associated with these putative cases of unconscious experience. For instance, it is notable that the unconscious experiences of automatic driving are not remembered by their subjects, whereas there is no evidence that animals are similarly unable to recall their allegedly unconscious experiences. Likewise, blindsight subjects do not spontaneously respond to things presented to their scotomas, but must be trained to make responses using a forced-response paradigm (Stoerig & Cowey 1997). There is no evidence that such limitations are normal for animals, or that animals behave like blindsight victims with respect to their visual experiences (Jamieson & Bekoff 1992).

### **Dissimilarity arguments**

The Cartesian argument against animal consciousness, which is based on the alleged failure of animals to display certain intellectual capacities, is illustrative of a general pattern of using

certain specific dissimilarities between animals and humans to argue that animals lack consciousness. Descartes dismissed parrots vocalizing human words because he thought it was merely meaningless repetition. This judgement may have been appropriate for the few parrots he encountered, but it was not based on a systematic, scientific investigation of the capacities of parrots. Nowadays many would argue that Pepperberg's studies of the African Grey parrot "Alex" (Pepperberg 1999, 2002) should lay the Cartesian prejudice to rest. These studies, along with several on the acquisition of a certain amount of linguistic competence by chimpanzees and bonobos (e.g., Gardner et al. 1989; Savage-Rumbaugh 1996; Fouts et al. 2002) would seem to undermine Descartes' assertions, even if it remains true that other animals have not fully mastered the recursive phrase structure grammar of natural human languages (Hauser et al. 2002).

Convinced by evidence of sophisticated cognitive abilities, most theorists these days agree with Block that something like access consciousness is properly attributed to many animals. Nevertheless, when it comes to phenomenal consciousness, dissimilarity arguments may give pause to defenders of animal sentience, for surely most would agree that, at some point, the neurological, anatomical, and behavioral dissimilarities between normal adult humans and members of other species (the common earthworm *Lumbricus terrestris*, for example) are so great that it is unlikely that such creatures are sentient. A grey area arises because few can say how much dissimilarity is enough to trigger the judgment that sentience is absent.

### **Methodological arguments**

Many scientists remain convinced that even if questions about self-consciousness are empirically tractable, no amount of experimentation can provide access to phenomenal

consciousness in nonhuman animals. This remains true even among those scientists who are willing to invoke cognitive explanations of animal behavior that advert to mental representations or cognitive states. Opposition to dealing with consciousness can be partly understood as a legacy of behavioristic psychology, first because of the behaviorists' rejection of terms for unobservables unless they could be formally defined in terms of observables, and second because of the strong association in many behaviorists' minds between the use of mentalistic terms and the twin bugaboos of Cartesian dualism and introspectionist psychology (Bekoff & Allen 1997). In some cases these scientists are even dualists themselves, but they are strongly committed to denying the possibility of scientifically investigating consciousness, and remain skeptical of all attempts to bring it into the scientific mainstream.

Because consciousness is assumed to be private or subjective, it is often taken to be beyond the reach of objective scientific methods (Nagel 1974). This claim might be taken in either of two ways. On the one hand it might be taken to bear on the possibility of answering the Distribution Question, i.e., to reject the possibility of knowledge that a member of another taxonomic group (e.g., a bat) has conscious states. On the other hand it might be taken to bear on the possibility of answering the Phenomenological Question, i.e., to reject the possibility of knowledge of the phenomenological details of the mental states of a member of another taxonomic group. The difference between believing with justification that a bat is conscious and knowing what it is like to be a bat is important because, at best, the privacy of conscious experience supports a negative conclusion only about the latter. To support a negative conclusion about the former one must also assume that consciousness has absolutely no measurable effects on behavior, i.e., one must accept epiphenomenalism. But if one rejects epiphenomenalism and maintains that consciousness does have effects on behavior then a strategy of inference to the best explanation may be used to support its attribution.

## **Evaluation of Arguments For Animal Consciousness**

### **Similarity arguments**

Most people, if asked why they think familiar animals such as their pets are conscious, would point to similarities between the behavior of those animals and human behavior. Similarity arguments for animal consciousness thus have roots in common sense observations. But they may also be bolstered by scientific investigations of behavior and neurology as well as considerations of evolutionary continuity (homology) between species. Many judgments of the similarity between human and animal behavior are readily made by ordinary observers. The reactions of many animals, particularly other mammals, to bodily events that humans would report as painful are easily and automatically recognized by most people as pain responses. High-pitched vocalizations, fear responses, nursing of injuries, and learned avoidance are among the responses to noxious stimuli that are all part of the common mammalian heritage. Similar responses are also visible to some degree or other in organisms from other taxonomic groups. Less accessible to casual observation, but still in the realm of behavioral evidence are scientific demonstrations that members of other species, even of other phyla, are susceptible to the same visual illusions as we are (e.g., Fujita et al. 1991) suggesting that their visual experiences are similar.

Neurological similarities between humans and other animals have also been taken to suggest commonality of conscious experience. All mammals share the same basic brain anatomy, and much is shared with vertebrates more generally. A large amount of scientific research that is of direct relevance to the treatment of conscious human pain, including on the efficacy of



analgesics and anesthetics, is conducted on rats and other animals. The validity of this research depends on the similar mechanisms involved and to many it seems arbitrary to deny that injured rats, who respond well to opiates for example, feel pain. Likewise, much of the basic research that is of direct relevance to understanding human visual consciousness has been conducted on the very similar visual systems of monkeys.

Such similarity arguments are, of course, inherently weak for it is always open to critics to exploit some disanalogy between animals and humans to argue that the similarities don't entail the conclusion that both are sentient (Allen 1998). Even when bolstered by evolutionary considerations of continuity between the species, the arguments are vulnerable, for the mere fact that humans have a trait does not entail that our closest relatives must have that trait too. There is no inconsistency with evolutionary continuity to maintain that only humans have the capacity to learn to play chess. Likewise for consciousness. Perhaps a combination of behavioral, physiological and morphological similarities with evolutionary theory amounts to a stronger overall case. But in the absence of more specific theoretical grounds for attributing consciousness to animals, this composite argument -- which might be called "the argument from homology" -- despite its comportment with common sense, is unlikely to change the minds of those who are skeptical.

### **Inference to the best explanation**

One way to get beyond the weaknesses in the similarity arguments is to try to articulate a theoretical basis for connecting the observable characteristics of animals (behavioral or neurological) to consciousness. Inferences of this kind would be strengthened by a good understanding of the biological function or functions of consciousness. If one knew what

phenomenal conscious is for then one could exploit that knowledge to infer its presence in cases where that function is fulfilled, so long as other kinds of explanations can be shown less satisfactory -- an inference to the best explanation.

If phenomenal consciousness is completely epiphenomenal, as some philosophers believe, then a search for the functions of consciousness is doomed to futility. In fact, if consciousness is completely epiphenomenal then it cannot have evolved by natural selection. On the assumption that phenomenal consciousness is an evolved characteristic of human minds, at least, and therefore that epiphenomenalism is false, then an attempt to understand the biological functions of consciousness may provide the best chance of identifying its occurrence in different species.

Such an approach is nascent in Griffin's attempts to force ethologists to pay attention to questions about animal consciousness. (For the purposes of this discussion we assume that Griffin's proposals are intended to relate to phenomenal consciousness, as well, perhaps, to consciousness in its other senses.) In a series of books, Griffin (who made his scientific reputation by carefully detailing the physical and physiological characteristics of echolocation by bats) provides examples of communicative and problem-solving behavior by animals, particularly under natural conditions, and argues that these are prime places for ethologists to begin their investigations of animal consciousness (Griffin 1976, 1984, 1992). Although he thinks that the intelligence displayed by these examples suggests conscious thought, many critics have been disappointed by the lack of systematic connection between Griffin's examples and the attribution of consciousness (see Alcock 1992; Bekoff & Allen 1997; Allen & Bekoff 1997). Griffin's main positive proposal in this respect has been the rather implausible suggestion that consciousness might have the function of compensating for limited neural

machinery. Thus Griffin is motivated to suggest that consciousness may be more important to honey bees than to humans.

If compensating for small sets of neurons is not a plausible function for consciousness, what might be? The commonsensical answer would be that consciousness "tells" the organism about events in the environment, or, in the case of pain and other proprioceptive sensations, about the state of the body. But this answer begs the question against higher-order accounts of consciousness for it fails to respect the distinction between phenomenal consciousness and mere awareness (in the uncontroversial sense of detection) of environmental or bodily events.

Perhaps more sophisticated attempts to spell out the functions of consciousness are similarly doomed. But Allen & Bekoff (1997, ch. 8) suggest that progress might be made by investigating the capacities of animals to adjust to their own perceptual errors. Not all adjustments to error provide grounds for suspecting that consciousness is involved, but in cases where an organism can adjust to a perceptual error while retaining the capacity to exploit the content of the erroneous perception, then there may be a robust sense in which the animal internally distinguishes its own appearance states from other judgements about the world. (Humans, for instance, have conscious visual experiences that they know are misleading -- i.e., visual illusions -- yet they can exploit the erroneous content of these experiences for various purposes, such as deceiving others or answering questions about how things appear to them.) Given that there are theoretical grounds for identifying conscious experiences with "appearance states", attempts to discover whether animals have such capacities might be a good place to start looking for animal consciousness. It is important, however, to emphasize that such capacities are not themselves intended to be definitive or in any way criterial for consciousness.

Carruthers (2000) makes a similar suggestion about the function of consciousness, relating it to the general capacity for making an appearance-reality distinction; of course he continues to maintain that this capacity depends upon having higher-order concepts that are beyond the grasp of nonhuman animals.

### **Broader implications**

Many of the issues raised above are couched abstractly, but questions about animal consciousness, especially sentience, are also enormously important for practical matters of applied animal welfare (Bekoff 2002; Mendl & Paul 2004). The authors of animal welfare laws struggle to define sentience in a way that makes objective legal enforcement possible (Allen 2004b). The topic of animal consciousness connects to theoretical issues in ethics because of wide, although by no means universal, acceptance of the biconditional statement [A]: animals deserve moral consideration if and only if they are sentient (especially possessing the capacity to feel pain). Many are inclined to take it for granted that animals are conscious, regarding any theory of consciousness that denies this as defective, and concluding from [A] that animals deserve moral protection. In this connection it is also sometimes argued that if there is uncertainty about whether other animals really are conscious, the morally safe position is to give them the benefit of the doubt. Others, however, are inclined to use [A] in the other direction, denying that animals are sentient and concluding that animals do not deserve moral consideration. Indeed Carruthers (1989) even argued that given their lack of sentience, it would be immoral not to use animals for research and other experimentation if doing so would improve the lot of sentient creatures such as ourselves. He has more recently backed off this view (1998b), denying [A] by claiming that sentience is not the sole basis for moral

consideration, and claiming that animals qualify for consideration on the basis of frustration of their unconscious desires. Varner (1999) disagrees with Carruthers by arguing for conscious desires throughout mammals and birds, but like Carruthers he also rejects [A], arguing for an even more inclusive criterion of moral considerability in terms of the biological "interests" that all living things have.

Neuroscientists regularly use animal models for empirical investigation of conscious phenomena. For most philosophers, however, the topic of animal consciousness is of peripheral interest to their main project of understanding the ontology of consciousness. Because of their focus on ontological rather than epistemological issues, there is often quite a disconnect between philosophers and scientists on these issues. Nevertheless, there are encouraging signs that interdisciplinary work between philosophers and behavioral scientists is beginning to lay the groundwork for addressing some questions about animal consciousness in a philosophically sophisticated yet empirically tractable way (Allen et al. 2005; Aydede 2005). In some ways, perhaps, we are not much further along than the cave artists of Lascaux, painting animals on the walls of their cave 17,000 years ago. These ancient hunters were no doubt careful observers of the wild behavior of the animals they depended on for survival. We shall never know, but we might reasonably guess that, not being very different from ourselves, these early naturalists would have wondered what it was like to be the aurochs, horses, and deer they depicted. A modern, integrated science of animal consciousness, must combine functional understanding derived from naturalistic observation with the latest techniques from the lab. Philosophers, in particular, have much to gain and to contribute by getting out of the armchair and into the field. The stakes are high -- answers inform where humans fall in the evolutionary scheme of things and influence how animals are treated -- and more detailed interdisciplinary studies are needed.

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## **Note**

1. This piece is adapted from Allen, C. (2003) "Animal Consciousness", *The Stanford Encyclopedia of Philosophy* (Summer 2003 Edition), Edward N. Zalta (ed.), URL =

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