
Animal Minds is Donald Griffin's third book on what he has succeeded in getting people to call cognitive ethology. Like its predecessors (Griffin 1976, 1984), its theme is that many if not all animals may lead subjective lives comparable to those of humans, although less rich in capacity and content, and that much animal behavior testifies to this proposition.

The book begins and ends with discussion of general conceptual issues, such as defining consciousness, the narrow-mindedness of behaviorism, philosophical stances, and ethical implications. In between, it marshalls the behavioral evidence in ten chapters divided among adaptive versatility to novel solutions, physiological activity that may be correlated with mental function, and communicative behavior. These central chapters are rich in new and fascinating information. Griffin has done a thorough search of recent books and journals bearing on cognitive ethology, and his accounts of the observations and experiments relevant to his theme are clear and appealing in the manner of the best science writing for a general audience.

However, I doubt whether the way Griffin uses this evidence to support his case will change the opinions of many tough-minded critics. I frequently felt let down when, after a beautiful description of some remarkable bit of behavior, the link to the central theme was made with a rather limp query like "could it not be that the animal was consciously thinking about what it was doing?" or "is this not suggestive of intentional planning?" I agree that if I imagine myself in the situation of the animal and doing what it did there, I do think of having certain perceptual experiences, being in such and such an emotional state, and intending or planning the course of action with a certain end in view. But that is different from being persuaded that the animal had anything like my sensations, thoughts, or intentions, for the comparability of what went on in the animal and what might have gone on in me is just what needs to be demonstrated. In the absence of some substitute for the old ejective approach of trying to imagine oneself being the animal, it seems to me that Griffin's appeals amount to little more than hand waving.

I was reminded of William Paley's (1828) argument for the existence of God: the goodness of fit between the designs of organisms and the worlds they inhabit is so exquisite that only a creative mind could have brought it to pass. We know what Darwin and natural selection did to that idea. Analogously, the fact that we may be unable to conceive how an animal's action would be possible in the absence of conscious awareness could turn out to be a current limitation of human imagination, for which advances in understanding of information processing in neural networks will show little respect.

As an advocate for the idea of animal awareness, Griffin emphasizes what supports and is consistent with the case; he takes opposing positions...
into account only to show how they can be countered. This bias may have led him to represent the matter of animal minds as simpler than it really is. There seem to be a number of conceptual issues that complicate his case but to which he gives less than due attention. I have mentioned three: what we mean by such terms as consciousness and thinking, the network or holistic conception of meaning, and unconscious mental processes.

Griffin does address the fact that consciousness covers a variety of mental states but confines himself to the distinctions recognized in only one of a number of different taxonomies of ways of being conscious. Also, he does not grapple with the contention that, no matter how you divide up conscious states, they do not constitute a "natural kind" (as argued by Wilkes and Churchland 1988), any more than animal communication can attest: any more than any other natural kind. Thus, the problem of determining what the natural kinds of mental states are has yet to be solved, indeed has hardly been tackled. In the meantime, the cognitive psychologist and the cognitive ethologist make do with the categories of common-sense psychology, which is rich in nuance but poor in the sort of sharp precision needed in scientific language (c.f. Wilkes 1989).

Common-sense psychology has been represented as a theory, and the current view is that the terms in scientific theories get their meanings from their relationships to one another rather than by definitions grounding them in empirical foundations. This holistic view has been extended to the meanings of words in general. Whether we regard common-sense psychology as a theory, its terms can be considered to constitute a network of semantic and logical relations, interwoven through which are all the connections that depend on language. When we try to apply these terms to how animals might experience or think about the world, huge portions of the network have to be left behind. Our ways of describing what we think might be going on in an animal's head are likely to reflect our own minds more than the animal's.

Unconscious mental processing has been dramatically demonstrated by human patients manifesting blindsight, the ability to point to or guess at the shapes of objects presented in blind areas of their visual fields (Weiskrantz 1988). Even more remarkable evidence from a monkey deprived of its entire visual cortex (Humphrey 1974) exemplifies how overt behavior can be a poor guide to what an animal is consciously experiencing as far as sensory perception is concerned: stimuli can be registered, processed, and acted on without consciousness having to be involved anywhere along the way. Similarly, one has only to reflect on how much of one's own cognitive processing is inaccessible to awareness—as when one is trying to recall a name—to see that problem solving, anticipation, and other accomplishments of animals do not compel inference to conscious accomplishments.

Griffin ends his book by saying, "Cognitive ethology presents us with one of the supreme scientific challenges of our times, and it therefore calls for our best efforts of critical and imaginative investigation" (p. 260). If the challenge is to be met, I suspect that critical and imaginative efforts of more radical kinds than those presented here will be required. Meanwhile, this installment of Griffin's account of cognitive ethology should, through its eloquence and informative description, help to sustain what the first book brought back to life.

**References cited**


**HOPE FROM THE VICE-PRESIDENT**


Al Gore sounds more like Paul and Anne Ehrlich, E. O. Wilson, and other conservation biologists than like a politician. Excellently written, this book provides a superb outline on how to reverse humankind's self-destructive path of environmental abuse in order to create a sustainable society.

**Earth in the Balance** is divided into three parts. In the first, Gore reviews current environmental threats, following a tradition that can be traced from Rachel Carson's *Silent Spring* to Bill McKibben's *The End of Nature*—a nonstop string of gloom and doom, the world is coming to an end, and the sky is falling—that sounds a lot like The Book of Revelations. How inconvenient for humankind (to put it mildly) that these predictions are all well backed by science. Global warming, acid rain, ozone depletion, deforestation, pollution, and biodiversity loss are all carefully reviewed and meticulously referenced. This section alone makes the book worthwhile as a good summary of the state of the environment.

In the second part, Gore seeks and partially finds answers to the question, Why did we get into this mess? His analysis includes considerations ranging from religion to child psy-