Animal Thought

Stephen Walker

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Preface

My argument in this book is as follows: human thought is intimately connected with the activities of the human brain; other vertebrate animals apart from ourselves have very complicated brains, and in some cases brains which appear to be physically very much like our own; this suggests that what goes on in animal brains has a good deal in common with what goes on in human brains; and laboratory experiments on animal behaviour provide some measure of support for this suggestion. In presenting this argument I deal with philosophical opinion about animal psychology, anatomical and physiological studies of the brain, evolutionary theory and the natural life of vertebrate species, and experimental tests of the psychological capacities of animals. I am very much aware that I have given an incomplete account of all these specialised areas, but I have tried to include enough material to give the intelligent layman, or the intelligent undergraduate, a general impression of what kinds of information are available. Some gaps now seem particularly glaring: I have deliberately avoided the question of how theories of animal psychology might impinge on opinions about our moral responsibilities towards animals, but in evolutionary biology and brain physiology many new findings and hypotheses have simply been missed out.

I conclude that it makes sense to suppose that awareness and mental organisation occur in animals, without the involvement of language, but I do not deny that human speech and writing constitute an exceptional influence on mental activity. In the following pages I have attempted to minimise the use of technical terms, in the hope that there may be some underlying ideas which are more accessible without them.

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1 Descartes's dichotomy

'*Animal thought*' could be an extremely short book. I could define thought as something which never occurs in animals, and spare myself and the reader any further efforts. There are certainly precedents for this—the weight of opinion is that animals don't think, but people do. In this century, few psychologists have been disposed to argue the point: in fact, the main psychological movement which has concerned itself with animals, behaviourism, can be said to be founded on the proposition that neither animals, nor people, think.

The last ten or fifteen years have seen a turning away from the restrictions of behaviourism and a freer attitude to the study of mental life even within the bastions of academic respectability. It is appropriate therefore to exhume certain long-buried problems in the field of animal psychology, and to address new questions which have arisen from the application of modern behavioural and biological techniques.

That there are problems, both old and new, can be seen by examining a little more closely the assumption that thought is a uniquely human activity. There is such a long list of human attributes—speech and writing, art and science, savagery and civilisation—that it would seem at first sight sensible to conclude that every aspect of human mentality is unique. There is something to be said in favour of this conclusion, but difficulties appear when the characteristics of human knowledge are analysed into component parts. Thought can be defined as any form of mental activity, but the study of thought must always begin by the separating out of different kinds or modes of mental experience. Traditional categories include perception, memory, feeling, reasoning, awareness, reflection, foresight and intuition. Are all these things equally excluded to animals?

This is where subtle differences of opinion begin to blur the initial unanimity of view. Are all animals to be denied all of the various faculties of the human mind, or may we allow that certain of the most favoured members of the bestiary have feeling, but not reason, perception but not memory, or intuition with no reflection? There is at least room for argument. Before examining some of the arguments, it is worth pointing out that the questions are put in a form which asks about some, rather than all, members of the animal kingdom. The possibility of differences between animal species, aside from differences between animals generally and man particularly, will have to be taken seriously in later chapters. Strictly speaking, all forms of life not considered plants or fungi may count as animals, from single-celled organisms to primates. But clearly some species, such as the chimpanzee, are very much more like ourselves than others, such as tapeworms, and for that reason questions about human-like thought in chimpanzees are more important than similar questions about the tapeworm. I shall follow a technically improper, but common, usage, of usually meaning vertebrates, from fish to man, when I say animal, and in many cases the interest will mainly be in mammals.

I intend in this chapter to canvass the views of philosophers on the nature and extent of thought in animals. The limits of human knowledge, and in particular its relationship to perception via the senses, and to intuition, reason and language, are topics that philosophers have opinions about. The ways in which human thought and knowledge depend on the human brain—the mind-body problem—is, like the other matters, the subject of highly technical philosophical considerations. However, I shall attempt to use the mind-body problem as an avenue by which the area of animal thought can be approached. Briefly, there is a considerable body of work which attempts to show that the human mind can be conceived of entirely in terms of states of the human brain. Since there is a large amount of scientific evidence available concerning the similarity of human and animal brain function, tying human thought to brain function automatically implies a continuity between human and animal thought.

Any survey of views on the status of the animal mind should, however, begin with Descartes (1595–1650), who denied its existence. Descartes is considered to be the father of modern philosophy, since he believed that the application of a scientific method could supply new

and better answers to all questions about the physical nature of the universe. He is in many ways a paradoxical figure, a reductionist who wished to discuss geometry in terms of numbers, and physiology in terms of geometry, but yet a supporter of theological orthodoxy. Whether his religious orthodoxy was a product of conviction or convenience is uncertain, but it was strong enough to make him suppress the publication of his major work *Le Monde* when he heard of Galileo's run in with the Vatican in 1633. Only fragments of *Le Monde* were ever published (after his death) and possibly in this or other unpublished work Descartes experimented with out-and-out materialism, doing away with souls in either animals or men. It is certain that he shared Galileo's heretical views about the rotation of the earth, and the infinity of the universe, and there are points where his analysis of human physiology begins to make the soul seem superfluous. But his positive and published statements about the separation of the soul from the body are clear enough. In a craven and slavish dedication of his *Meditations* to 'the very sage and illustrious Dean and Doctors of the Sacred Faculty of Theology in Paris', Descartes avows the goal of his work to be to convince infidels and atheists of the reality of God. In the *Discourse on Method*, for which he is largely remembered as a philosopher, he says that, as theological errors go, 'there is none more powerful in leading feeble minds astray from the straight path of virtue than the supposition that the soul of brutes is of the same nature with our own.' (Feeble-minded readers, beware!)

The dangers of the assumption that animals have souls like our own are not now particularly obvious. At the time the worry was apparently that the hopes and fears about life after death, which were held responsible for keeping feeble minds to the straight and narrow during their earthly sojourn, would somehow be diminished by the proposition that flies and ants would also be present on the Day of Judgment. But as aids to conscience other religions have made use of a supposed interchangeability of souls by threatening miscreants with a future life as a fly or an ant. An alternative tactic would be to allow animals inferior and temporary souls, which did not survive after death, or to allow animals immortal souls, but diminished moral responsibilities. St Thomas Aquinas, for instance, was considerably more charitable towards animals in terms of their mental capacities and possible after-life than Descartes (see Aquinas's *Philosophical Texts*, 1951).

Because Aquinas accepted both an Aristotelian scale of being, and

the Platonic version of souls which can be present even in vegetables and inanimate objects, his estimation of animal intelligence matches or exceeds that of the most anthropomorphic post-Darwinians. In Aquinas's view there is a fairly continuous grading of souls between plants and God, with animals distinguished from plants by having sensitive souls—animals perceive external objects through their senses, and this data is held in the imagination before entering the deeper store of memory. The sensitive powers of animals are 'conscious within themselves' and consequently 'what begins from without is worked up from within'—a very sophisticated kind of information processing. Men are superior to animals in having intellective souls which can reason, deliberate, and reflect on themselves. However, animals, especially the higher ones, retain and preserve their perceptions, exhibit anticipatory actions, can adapt means to ends, and can perceive purposes not immediately apparent to the external senses. As far as the purely sensitive or perceiving soul goes:

> Man's superiority to beasts in animal shrewdness and memory does not result from anything proper to the sensitive part, but from an affinity and closeness to intelligence which, so to speak, flows into them. These powers in man are not so very different from those in animals, only they are heightened. (Aquinas, 1951, p. 230)

Because the role assigned to the animal soul in sensing and feeling is very much the same as that for the human soul performing similar functions, Aquinas is able to speak of the souls of horses and the souls of men in the same breath, and to entertain the idea that the souls of animals are immortal. He thinks that this would be improbable, but notes that it would not conflict with Plato (see 1951, p. 199 and also pp. 182, 195, 198, 201, 203, 228–30, and 256).

Although Aquinas wrote in the thirteenth century, he was the major theological authority of the fifteenth, and one to whom Descartes might have appealed—Aquinas having been a member of the Faculty of Theology which Descartes tried to placate. Descartes was not being particularly conventional in denying the existence of an animal soul; on the contrary, the mechanistic interpretation of animal behaviour could be seen as a suspicious change in the tradition of having souls with everything—and this may explain Descartes's protestations of virtue and orthodoxy in the case of man. Descartes was not original in

being a dualist, but innovative in abandoning dualism for animals other than man.

Descartes's dualism

When Descartes moved from Paris to Holland, where he was to live for twenty years, he took with him very few books, but among them were the works of Aquinas. His own theories stripped away most of Aquinas's dualism, substituting systematic materialism and determinism. All life with the exception of the human soul became, in Descartes's hands, reducible to the laws of physics. In his view, animals are unthinking machines, or automata, lacking conscious perception of even the immediate world about them. There is thus a fixed and unbridgeable dichotomy, with animals, as machines, on the one side, and men, possessing rational souls, on the other.

There are three parts to Descartes's argument that animals are automata. The first is the argument by analogy with the clockwork models popular at the time. The most long-lived example of these toys is the cage of mechanical canaries. If such things can be fabricated by human industry, says Descartes in the *Discourse on Method*, how much better might be machines put together by the hand of God? The second theme, by which more substance is added to this analogy, is the detailed description of mammalian sensory physiology and anatomy—the divine biological machinery. Descartes was most concerned with the sense of vision (dioptrics), but he was also a fervent admirer of Harvey's experiments which demonstrated the circulatory function of the heart, and gives a comprehensive account of emotion and perception of the sort one would nowadays find in a textbook of physiological psychology (see *Principles of Philosophy* (1978a), part IV, and *Passions of the Soul* (1952)). Although his physiology was rather primitive by modern standards, if one interprets 'movements' passing through nerves as their electrical activity, and 'animal spirits' as brain chemicals, some of what Descartes said would not be out of place in an up-to-date text. His own experiments included the dissection of an ox's eye with observation of the inverted visual image formed on the retina. His discussion of why the inversion of the image does not matter, because features of the information contained in the image, not pictures themselves, are transmitted down the optic nerve, is fascinating, and the account of the roles of binocular disparity and eye

movements in the perception of distance, and the automatic adjustments of pupil size and focal length in the eyeball, are hard to fault. There may have been much that Descartes did not know about the neurophysiology of the visual system, but his description of how the perceived qualities of brightness and colour (the only qualities peculiar to sight) and position, distance, size and shape are 'determined by the strength of disturbance' at the eventual termination of the 'optic nerve fibres in the brain' is remarkably consistent with recent theories, as is also his discussion of the after-images and visual persistence experienced when we close our eyes after looking at bright objects.

Ironically, the strength of Descartes's theories was largely due to his general idea that perception and feeling should be interpreted in terms of a one-to-one correspondence with neural states of the brain. In his view, of course, there was a further one-to-one correspondence between states of the brain and experiences of the soul, but the rigour with which he developed the first correspondence was original and exceptional (especially bearing in mind the naivity of some of his contemporaries, such as the English philosopher Hobbes, who still believed emotions were experienced in the heart). Descartes analysed taste, smell and hearing, as well as vision, in terms of the motions existing in the relevant sensory nerves, but the general flavour of his theory is given here:

> We must know, therefore, that although the human soul is united to the whole body, it has, nevertheless, its principle seat in the brain, where alone it not only understands and imagines, but also perceives; and this by the medium of the nerves, which are extended like threads from the brain to all the other members, with which they are so connected that we can hardly touch one of them without moving the extremities of some of the nerves spread over it; and this motion passes to the other extremities of those nerves which are collected in the brain . . . . the movements which are thus exited in the brain by the nerves, variously affect the soul or mind, which is intimately conjoined with the brain. (*Principles*, 1978a, part IV, §II, pp. 214–15)

The arguments with which Descartes supported his thesis that perception and feeling take place in the brain, and are to some extent isolated from other parts of the body, and from external objects, are instructive, and some of them have been repeated ever since. The most

familiar to readers of present-day psychological texts is probably the argument from the 'phantom-limb' phenomenon. In the *Principles*, Descartes quotes the case of a girl with an ulcerated hand, who had her eyes covered whenever the surgeon changed the dressings as she could not bear the sight of the sores. Amputation at the elbow became necessary, and in Descartes's story linen cloths were substituted to give the impression of a remaining forearm. After the operation the girl continued to complain of pain in the now absent hand—sometimes in one finger and sometimes in another. Descartes gives the now standard explanation that neural messages reaching the brain mimicked those which occurred with the limb intact. Retained subjective feeling 'in' the removed limb is a common phenomenon after amputations, even without subterfuges to disguise the limb's absence, and the fact is still used to support physiological theories of sensation (e.g. Hebb, 1966). Similarly, 'seeing stars' after a blow on the head, or after relatively minor distortions of the eyeball, suggested to Descartes that it is activity in the optic nerve which gives rise to the subjective sensation of light. But the sensory nerves for the various modalities look sufficiently similar to one another to imply that they all convey information to the brain in the same form. Therefore we should assume that nothing at all reaches the brain besides 'the local motion of the nerves themselves' (*Principles*, 1978a, part IV, §XI).

The observations on nerves, and on the structure of the eye, applied to animals; but by working out in such detail the way in which sensory and nervous apparatus functioned, Descartes was painting himself into a corner, with his soul uneasily surrounded by mechanisms. Others, such as La Mettrie (1709–51), completed the job, and became pure mechanists or materialists, supposing that the conscious perceptions of both animals and men can be explained by a sufficiently detailed account of brain functioning. What were Descartes's grounds for resisting this extension of his own physical determinism? Apart from extraneous theological motives, there was an aspect of Descartes's systematic method which approached the problem of sensation from another direction—the method of doubt concerning all subjective knowledge.

Descartes is remembered not so much for his neurophysiology as for his proposition that while one can doubt the existence of sensory mechanisms, or the existence of the body itself, one cannot doubt the subjective experience of perception, or if one does, one cannot then