

is a dreadful example). Moreover reductionism in animal behaviour *complements* its ostensible opposite, anthropomorphism. Because it cannot account for new, emergent properties it opens the way to semi-mystical explanations as in Jan Smuts's Holist philosophy and, to some extent, Gestalt psychology. Physiologists have a powerful tendency to take a reductionist view of whole-animal behaviour because they habitually think in terms of one bodily function at a time (examples in Kennedy 1972). But this topic would require another book and is hardly touched on here.

Another thing I should say at the outset is that I am of course no exception to my claim that everyone remains in danger of falling into anthropomorphism without noticing (p. 32). I can recall having slipped into anthropomorphism four times at least, taking quite a time to realize each slip. On the first occasion I ascribed the extraordinarily persistent locomotory activity of swarming desert locusts to a "locomotory drive" (Kennedy 1951). That was when ethology had just hit the English-speaking world and recent converts like myself were anxious to acknowledge the existence of internal causes of behaviour which we had been taught to discount. Needless to say my tautology advanced our understanding of the causal mechanisms of locust behaviour not one whit. Nor could it, unfortunately, immunize me against further unconscious lapses into anthropomorphism. It is not long, for example, since I was persuaded for a while by Gallup's (1982) striking claim to have demonstrated self-awareness in chimpanzees, an issue dealt with in 5.3. All I can do is refer the reader to the quotation from Clark Hull at the end of Chapter 2.

CHAPTER 2

2.1 Anthropomorphism and teleology

Anthropomorphism in the context of animal behaviour means "the ascription of human mental experiences to animals" (Asquith 1984, p. 138). We are familiar with three kinds of mental (= subjective, conscious) experience: *feelings* – pleasure, pain, the various emotions and sensations (sense-impressions), *motivations* – the goals and purposes of our actions, and *thought* more or less independent of motor action. We are directly aware of these things only in ourselves, through introspection. This means that simply taking it for granted that animals feel and think too, or explaining a piece of animal behaviour "by merely pointing to the goal, end or purpose" of it (as Tinbergen (1951) complained) are by definition examples of unwarranted anthropomorphism – effectively a throw-back to primitive animism.

There is an important source of confusion here that must be cleared away immediately. It is in the pejorative sense of Asquith's definition above that I shall be using the word anthropomorphism throughout this book. Sometimes, however, the word is used to mean merely pretending for argument's sake that an animal can think or feel as we do. That pretence, the so-called 'intentional stance' which I shall call 'mock anthropomorphism', can be very valuable for the hypotheses it generates about the functions of the animal's behaviour, as described in 5.1 on 'Intentionality'. The vital distinction between these two uses of the term anthropomorphism must always be kept in mind, for it is rather easy to confuse them.

Keeton bracketed teleological thinking with anthropo-

morphism in the passage quoted in Chapter 1, p. 1. This is because for us, introspectively, the formation of a mental image of the goal, end or outcome of a conscious action precedes the performance of that action and is a prime cause of it (see also pp. 51 and 84). That is what we mean when we describe an action as purposeful, intentional or goal-directed, and it is a human mental experience which we cannot assume that animals have. If we simply assume that they do have it, this is anthropomorphism. Of course, we cannot, alternatively, assert that animals do *not* have any feelings and purposes. There is no direct evidence either way, so Tinbergen (1951, p. 4) took the view that it was idle either to claim or to deny the existence of subjective phenomena in animals, a view some writers still take (e.g. Krebs 1977; Toates 1984*a*; Huntingford 1984).

2.2 Explicit anthropomorphism

However, the question of animal consciousness will not go away. In recent years Griffin (1976, 1978, 1981, 1984), a distinguished and avowedly materialist (ibid. 1984, p. 8) student of behaviour, has assembled a huge array of reports of animal accomplishments and capacities which, he suggests, might be accompanied by conscious thinking. This released a flood of resurgent anthropomorphism under the more respectable label of cognitive ethology (Bekoff & Jamieson 1990*b*; see 5.2). Griffin advanced most of his anthropomorphic interpretations in a guarded, conjectural fashion, and he conceded that "a behaviorist can argue that a completely unconscious organism could behave in the same adaptable fashion" (Griffin 1984, p. 208). But at the same time many less cautious formulations showed that Griffin himself was convinced that animals do think and feel. For example, "The major significance of the

research begun by the Gardners is its confirmation that our closest animal relatives are quite capable of varied thoughts as well as emotions" (ibid., p. 202). He was aware that more conclusive evidence was needed but confident it would be produced soon, especially from the work of the Gardners and others on the acquisition of human language by apes. But it has yet to be produced (see 2.4). In the last analysis, Griffin's massive case comes down to saying no more than this: if



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animals behaving in all those apparently intelligent ways were human, they would probably (though not necessarily) be conscious. Nothing more.

Incidentally, the case is not new. "Griffin's (1976, 1981) plea for acceptance of animal awareness is strongly reminiscent of Romanes' anthropomorphic 'ejective' approach" (Mitchell 1986). "Griffin seems hardly aware how closely this book [Griffin 1976] mirrors the writings of the functional psychologists: James, Angell, Jennings and others, who were active in America around the turn of the last century. They too were interested in the 'evolutionary continuity of mental experience'... Griffin's own interests, his style of argument, his evangelism all have a 70-year-old freshness to them" (Humphrey 1977). Dunbar shared Griffin's conviction that many animals are conscious (see p. 26, below), but he too found Griffin's case weak: "none of his examples is sufficient on its own to provide the kind of rigorous proof that will convince the sceptical rearward of behaviourism. They will rightly argue that perfectly sound adaptive explanations can be given for behaviour without it being necessary to invoke conscious thought processes.... The sceptics will want to know whether any of their explanations are inadequate if consciousness is left out of the equation, and the answer will by no means always be 'yes' even if animals are conscious in the human sense" (Dunbar 1984*b*). Quite so. Barlow (1987, pp. 365-6) and others have confirmed that last statement by pointing out that a great deal of our unconscious activity (for instance, in performing a skilled task) would look exceedingly clever if it were conscious; but it is not. In fact, learning a practical or social skill means removing the procedures from consciousness (Medawar 1976). Moreover

"many machines behave in ways which, if they were human, would suggest they had conscious mental

states.... It was just such an analogy which led Rene Descartes to deny the existence of consciousness in animals other than man... [his] idea of perception sans sensation may seem quite preposterous.... Yet... recent scientific evidence requires us to take it seriously... human beings can in fact show the behaviour of perceiving without being consciously aware of what they are doing." (Humphrey 1986, pp. 54-60)

Weiskrantz (1987) refers to some of that recent evidence in a passage quoted on p. 19 below; Marshall (1982) and Gould (1982) quote more of it. If consciousness is not always a necessary part even of human perception and behaviour, then evidence that animals behave adaptably and adaptively is not evidence that they think consciously.

2.3 The behaviourist taboo

Griffin bolstered his case for animal consciousness by arguing that "negative dogmatism generally known as behaviourism" had so far prevented the possibility of animal consciousness from being seriously considered. "Very few scientists," he said, "even realize the extent to which their thinking is constrained by this behavioristic taboo" (Griffin 1984, p. 20). Of course the behaviourists did not literally impose a taboo. But they did manage to convince many scientists that they would be guilty of unscientific thinking, even vitalism, if they described any behaviour in subjective, teleological language. The charge may have been correct in principle, but in practice, although a description might be couched in such unacceptable terms, it often alluded to a real phenomenon that had been overlooked by behaviourist observers wedded to over-simple concepts of behaviour. It is very true that "Fear of the dangers of anthropomorphism... caused ethologists to neglect many in-

teresting phenomena" as Hinde (1982, pp. 77-8) said; and Kummer (1982) elaborated the point. The neglect was an over-swing of the theoretical pendulum away from the rampant vitalism and anthropomorphism of the pre-behaviourist era. As Lorenz (1950, p. 223) recalled, the mechanist and vitalist schools fell into "reciprocal errors". But, he added, "we are justified in regarding the vitalistic errors as primary and the reciprocal errors of the mechanists' reactions justified in themselves and erring only through exaggeration".

Griffin, on the other hand, made the following ingenious suggestion in further support of his case for anthropomorphism: "Why do hard-headed scientists, so anxious to avoid implying that animals think or feel, use terms that in ordinary usage do connote conscious thinking? ... Perhaps what the behavioral ecologist observes in nature suggests consciousness so strongly that part of him does wish to suggest that animals think about the likely results of their actions" (Griffin 1984, p. 24). In fact, "hard-headed" scientists (i.e. neo-behaviourists) have a less devious reason for using anthropomorphic language to describe animal behaviour than a suppressed belief that animals really are conscious thinkers (see also 7.1). They choose to use our ordinary everyday language, although it is anthropomorphic, for the simple reason that it is our everyday language and therefore readily understood (Krebs & Davies 1981, p. 3; McFarland 1989c). Among themselves neobehaviourists believe it is being used in a purely metaphorical sense and really refers to the functions of the behaviour (Krebs & Davies 1981, p. 256; see also 3.6). The temptation to believe that animals think about the future is undoubtedly there, but neobehaviourists believe they are aware of it and resist it. R. Dawkins used a most readable anthropomorphic style in his book *The selfish gene* and took the trouble to explain that his uninhibited anthropomorphism was not to be taken literally. "We allow ourselves the licence of talking about genes

as if they had conscious aims, always reassuring ourselves that we could translate our sloppy language into respectable terms if we wanted to" (R. Dawkins 1976b, p. 95). However, the book owes much of its enormous success to its exceptional readability, its fluent and vivid anthropomorphic style, and this will have done little or nothing to encourage readers to stop and translate, for themselves, the conceptually "sloppy language" into objective terms. Encouraging that habit is still the only way to discourage 'sloppy', i.e. anthropomorphic, thinking about animal behaviour, but it is seldom done (see 7.4).

2.4 Uniqueness of *Homo sapiens sapiens*

The most widely held scientific reason for assuming that there must be some measure of consciousness in animals is the Darwinian principle that evolution has been a continuous process. Since the human nervous system is only quantitatively different from that of animals, Griffin argues, like many others from Romanes (1882, 1883) onwards, that products of the nervous system such as mental awareness should also differ only in quantity. Since the argument for animal minds depends critically on an analogy with ourselves, there is no discernible limit to how far we can carry it down the phylogentic scale. So, paradoxically, Griffin takes no account of an animal's position on that scale, following Romanes. "Having full regard to the progressive weakening of the analogy from human to brute psychology as we recede through the animal kingdom downwards from man, still, as it is the only analogy available, I shall follow it throughout the animal series" (Romanes quoted by Wasserman 1984). Thorpe and others are more consistent: "the only position compatible with the theory of evolution is that the development of consciousness has proceeded alongside that of the organic structures with which it corresponds (Thorpe 1974:

319–21) and consequently that it is present with varying degrees of elaboration and complexity at least in all higher animals" (Ingold 1986, p. 18). Krebs (1977) produced the short answer to that argument: "This assumes, of course, that quantitative differences are not translated by thresholds into qualitative effects." It seems that such a "translation" is exactly what probably happened in the evolution of *Homo sapiens*, as the anthropologist Isaac believed, below. Admittedly, another anthropologist, Geertz (1975, p. 62), summarily dismissed that "'critical point' theory of the appearance of culture..." as being "conceptualized as one of marginal quantitative change giving rise to a radical qualitative difference, as when water, reduced degree by degree without any loss of fluidity suddenly freezes at 0 °C...". But since then Passingham, a primate psychologist also at home in biology, has put together a body of facts about the development of the size and organization of the brain and the ways in which the brain acquires information postnatally that requires us to take Geertz's derisive description seriously. For example,

"How could it be that the *mental* distance between a person and a chimpanzee could so outstrip the *morphological* differences between them?... The genetic distance between a man and a chimpanzee is small: in fact, it is smaller than the distance between a mouse and a rat. And the story is similar if comparisons are made of structural proteins.... It is possible for a small genetic change to have very far reaching effects.... Our brain is three times larger than it should be for a primate as heavy as we are.... The device for producing so large a brain is a simple one. We need suppose only an alteration in genes controlling the timing of growth." (Passingham 1989)

"The most dramatic step came in early man" wrote Bonner (1980, pp. 188–9), "...a new and important genetic change

occurred that made the progress in this cultural transmission suddenly increase at an astounding rate... there was a change in a few genes that affected the timing of development... the brain was simply allowed to grow for a longer period of time than the rest of the body... a small genetic change produced a larger brain, that in turn was masterly at handling memes in a variety of ways including complex teaching." At what stage the 'translation' happened is quite unknown but the incipient development either of consciousness, or somewhat later of our grammatical language, would seem to be good candidates for the point of 'take-off' by *H. sapiens sapiens*.

Gould (1982), on the other hand, flatly dismissed the idea of any difference of kind between human and sub-human behaviour. His monumental treatise on ethology provides a wealth of documented evidence of 'genetic programming' of the behaviour of all animals. Comparing primates and human beings, he makes a convincing case that we did not "come into the world unprogrammed" (Gould 1982, p. 499) and declares that "the old notion that our species is different from the animal world... has become more and more absurd" (ibid., p. 483; cp. Dennett 1987, p. 110–12). This is fair comment as far as the reality of 'genetic programming' is concerned but in other respects Gould himself pays tribute to our uniqueness. For instance, "our species seems uniquely driven to make sense of the senseless, the uncertain, or the unknown, while other species face such ambivalent circumstances with placid apathy or generalized fear" (Gould 1982, p. 492). Or again, "We cannot know where, during the course of evolution, our increasing mental capacities spawned the will that now battles with our genes for control of our behaviour" (ibid., p. 541). The three 'our's' in that second statement carry the clear implication that rebellion against the genes is a product specifically of human evolution, unknown in other animals. R. Dawkins (1976b, 1989) and Dennett (1987, p. 298) agreed that

"[human brains] even have the power to rebel against the dictates of the genes, for instance in refusing to have as many children as they are able to. But in this respect man is a very special case." (R. Dawkins 1976*b*, pp. 63-4)

"We, alone on earth, can rebel against the tyranny of the selfish replicators." (Ibid., p. 215)

Human beings looked like a special case to the archaeological anthropologist Isaac: "we are rightly impressed with the biological success that seems to have followed from the development of the [human] brain through some critical threshold.... The brain is the organ of culture... the intricate body of language, craft skills, social custom, traditions and information which humans learn.... Cultural complexity and flexibility of this kind is unknown in any other organism" (Isaac 1983). The contrary view of Ingold (above), another anthropologist, rests on his gratuitous claim that animal action "is demonstrably governed by conscious purpose" (Ingold 1986, p. 35). The biologist Medawar (e.g. Medawar 1976), on the other hand, made the same point as Isaac many times, and the philosopher Fox (1986) enlarged upon it while Passingham (1989) wrote of man as "a creature quite unlike anything the world had ever known". It cannot, then, be assumed that the continuity of the evolutionary process means that we differ from other animals in degree only, or that other animals must be conscious to a significant degree.

2.5 Consciousness

In addition to the renewed advocacy of the very ancient notion of animals as conscious thinkers like ourselves, there has recently been renewed attention to the function of our

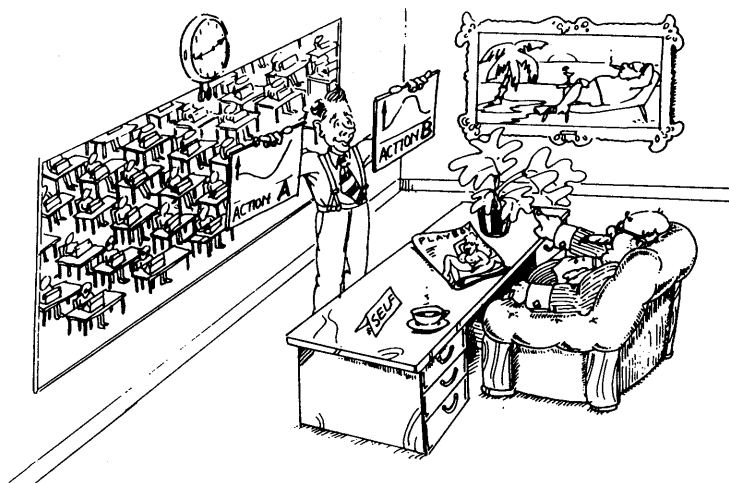
consciousness. The material mechanism of human consciousness is of course quite a different problem and there has been virtually no progress in understanding it (Blakemore & Greenfield 1987). But Humphrey echoed Morgan (1908) in saying: "either we throw away the idea that consciousness evolved by natural selection, or else we have to find a function for it" (Humphrey 1987). He has set forth an ethologists' logical reasons for supposing that its function is to act as the brain's self-monitoring system, "the Inner Eye" as he called it (Humphrey 1986, 1987). Weiskrantz's experiments on brain-damaged human patients with visual defects led him to a like conclusion:

"What are the implications of these two classes of patients, those with 'amnesic syndrome' and those with 'blindsight'? Both illustrate really quite striking capacities in the absence of the patient's own conscious knowledge. The person can process information if it leads to a straightforward and ambiguous route from stimulus to response, in the absence of 'thought'. What I think has become disconnected is a monitoring system, one that is not part of the serial information-processing chain itself, but which can monitor what is going on.... The 'monitoring system', to paraphrase Lloyd Morgan, is where intelligent processing ends and consciousness begins." (Weiskrantz 1987, p. 319)

Note that Weiskrantz, unlike Humphrey, envisaged not just one monitor but tier upon tier of them. Moreover, these monitors have executive power: "another monitor looking at a set of other monitors... an elaboration of hierarchical levels of organisation, and hence of varying levels of abstraction in thought... action must be capable of redirection as a result of the 'monitoring'; the monitor is not just another of Huxley's

epiphenomenal steam-whistles. 'Monitoring' reflects a form of neural organisation with a hierarchical capacity for control" (Weiskrantz 1987). That is an idea shared by Penrose (1987, Fig. 18.3, p. 267), who illustrated it with a cartoon chairman of a large corporation deciding between two sets of highly processed and simplified data assembled for him by minions at the lower levels of his organization.

There has recently been a shift of opinion concerning the selection pressure behind the evolution of intelligence and eventually of consciousness in the higher primates. The main pressure is now widely thought to have come from the growing complexity of their social interactions, rather than from tool-using and other practical activities, as used to be thought (Jolly 1966, 1972; Chance & Jolly 1970; Humphrey 1976, 1983, 1986, 1987; Crook 1980, 1987; Cheney & Seyfarth 1985; Barlow 1987, 1990; Byrne & Whiten 1988; Dunbar 1989; Zihlman



A model of consciousness. (Reproduced with permission from Penrose, R. 1987 In Blakemore, C. & Greenfield, S. (Eds.) *Mindwaves. Thoughts on intelligence, identity and consciousness*. Basil Blackwell, Oxford.)

1989). Given consciousness, human primates were able to communicate their subjective feelings and intentions to their fellows, and moreover, by analogy, to envisage what their fellows were feeling and therefore would do, and to act accordingly.

"Not only are [human] brains in charge of the day-to-day running of survival-machine affairs, they have also acquired the ability to predict the future and act accordingly." (R. Dawkins 1976*b*, p. 63)

"Consciousness provides us with an extraordinarily effective tool for understanding – by analogy – the minds of others like ourselves." (Humphrey 1987, pp. 380–1)

"We, the reason-representers, the self-representers, are a late and specialized product. What the representation of our reasons gives us is foresight...." (Dennett 1987, pp. 317–18)

Humphrey cited the seventeenth century materialist philosopher Thomas Hobbes making just the same point: "Given the similitude of the thought and passions of one man to the thoughts and passions of another, whosoever looketh into himself and considereth what he doth when he does think, opine, reason, hope, fear, &c., and upon what grounds, he shall thereby read and know what are the thoughts and passions of all other men upon the like occasions" (Hobbes 1651, cited by Humphrey 1986, p. 72).

Plainly, such a capacity for predicting the behaviour of fellows and acting accordingly would have thrown wide open the door to cooperation with those fellows to mutual benefit (Passingham 1982), extending indefinitely the scope for reciprocal altruism (Trivers 1971, 1985) enormously facilitated by language. Of course, it will have opened the door at the same time to competition by means of deception and cheating

(Trivers 1985; Byrne & Whiten 1988; McFarland 1989*a*, pp. 126–7, 146–7; *b*). These and other authors devote more attention to this competition and deception than to the cooperation. This may be partly because as Dunbar (1985) believed “the most plausible attempts to show that animals are conscious have come through asking whether they can lie deliberately”. McFarland (1989*a*, *b*, p. 146) even went so far as to suggest that “our belief that our behaviour is (sometimes) intentional is the result of evolutionary designed self-deception”. Perhaps we find incidents that look like deception to us especially convincing as evidence of animal consciousness simply because we ourselves are intensely conscious of what we are doing when we engage in deliberate deception. But that (an example of unwitting anthropomorphism?) is by the way. Competition in deception, deception-detection and counter-deception will have had the important consequence of driving cultural and perhaps biological evolution through “arms-races” (Dawkins & Krebs 1979), but no society in which communications were predominantly deceptive could last. Crying “wolf” when there is none is notoriously counter-productive. In reality, as Trivers (1985, p. 395) put it, “deception is a parasitism of the pre-existing system for communicating correct information”; or Axelrod (1984), “We all know that people are not angels, and that they tend to look after themselves and their own first. Yet we also know that cooperation does occur and that our civilization is based on it” (cp. Smith 1986; Noble 1989; Whiten 1989).

Our material achievements have obviously depended on massive cooperation achieved by communicating correct information. These achievements are, after all, staggering: “cultural evolution... has converted us into animals that are simultaneously aerial, terrestrial and submarine, processing X-ray eyes and sense organs sensitive enough to feel the heat of a candle at a distance of a mile.... This system of evolution is the

characteristic to which we owe our clear-cut biological supremacy over all other organisms because it has conferred almost unlimited capabilities upon us” (Medawar 1976, p. 502). Even more impressive than our material achievements (some of which we now recognize are against the long-term interests of everyone) are our intellectual achievements in the planning and designing of the technological triumphs, to say nothing of our non-technological cultural constructs: artistic, scientific, religious, political, legal, administrative and so on. The plain fact is that

“human beings have evolved to be the most highly social creatures the world has ever seen. Their social relationships have a depth, a complexity, and a biological importance to them, which no other animals’ relationships come near.” (Humphrey 1987)

If, therefore, this explosive development, which is thought to have required only some tens of thousands of years but amounted to a qualitative change, was made possible by the development of consciousness *de novo* in our species, then it seems most reasonable to infer that other animals are not conscious. Humphrey went on “No accident, I think, that human beings are as far as we know unique in their ability to use *self-knowledge* to interpret others. If that ability could exist without consciousness, let someone prove it to me. If any other animal possesses it, let someone tell me what evidence he has” (ibid.).

Humphrey was rather more equivocal about our uniqueness in his 1986 book, where he cited Premack’s and Gallup’s researches as evidence that not only we but possibly apes also “have insight into the way their own minds work” (Humphrey 1986, p. 81). Crook (1987), too, was more ready to concede some consciousness to apes than he had been in his 1980 book. But they both invoke the work on ape language and self-

awareness discussed here in 3.4 and 5.3, respectively, where it is concluded that the results cannot be interpreted to mean that these animals are conscious.

2.6 Unconsciousness

Altogether, then, it seems likely that consciousness, feelings, thoughts, purposes, etc. are unique to our species and unlikely that animals are conscious. If we were entirely logical about it these probabilities would be enough to make us try to avoid anthropomorphic descriptions of animal behaviour. But we are not entirely logical about it, and we have to ask why scientists as well as laymen should be so addicted to anthropomorphic expression. Various reasons have been advanced such as the convenience (e.g. Tinbergen 1951), the ease (e.g. Dunbar 1984*a*; M. S. Dawkins 1986), the appeal (McFarland 1989*c*), the colourfulness (Stuart 1983) or the familiarity (Kennedy 1987*a*; McFarland 1989*c*) of such language, as opposed to the "dry" and "non-committal" (Tinbergen 1951), "long-winded" (R. Dawkins 1976*b*, p. 95), "cumbersome" (Stuart 1983), "sterile and dull" (Burghardt 1985) language to which we have to resort in trying to avoid anthropomorphism. But the fact is that we do not make an impartial, rational choice between these alternatives, coolly weighing their relative merits. That unwelcome truth surfaces in the literature not infrequently, often giving the curious impression that the author is rather embarrassed by it. The following quotations come from an early comparative psychologist, a zoologist, two ethologists, a physiologist and two contemporary psychologists, in that order (my italics in each case).

"Whether we will or no we must be anthropomorphic in the notions we form of what takes place in the mind of an animal." (Washburn 1926, p. 12)

"It can be argued that no matter how excellent and pure our stated intentions may be, the words will unconsciously tend to *make us* interpret animal behaviour in human terms." (Bonner 1980, p. 12)

"...the teleological imperative – that people are *predisposed* to attribute intention (in the narrow sense) and purpose to other people and to animals" (McFarland 1989*c*)

"when we watch an animal 'searching' for food, or for a mate, or for a lost child, we *can hardly help* imputing to it some of the subjective feelings we ourselves experience when we search." (R. Dawkins 1976*b*, p. 53)

"...there is abundant objective evidence...that lower animals...have lasting phases of different responsiveness from other periods. One *cannot avoid* thinking of moods...." (Bullock 1965, p. 309)

"Humans not only attribute purpose, intent, and various mental states to one another, but there is a primate and *almost irresistible* tendency to generalize such attributions to pets and other animals." (Gallup 1982, p. 243)

"We *cannot avoid* teleological thinking and...it is therefore essential that we should engage in it consciously and critically in order not to be led astray." (Henry 1975, pp. 105–6)

We must indeed be under some kind of pressure to be so ready to believe in animal purposiveness even when it is impossible to meet the normal scientific requirement for proof. Even when authors do their best to avoid anthropomorphism, they find it difficult.

"The study of animal behaviour is unique among the sciences because it begins historically and methodologically with human behaviour, prescind from human experience, and projects this experience into other

animals. It is thus more disposed to subjectivity and introspection than the other sciences and constantly labours under the burden of containing these biases within their historical context....” (Dethier 1964)

“Everyday language carries meanings beyond what the users may wish to imply in behavioural research.” (Visalberghi & Frigaszy 1990*a*)

“Anthropomorphism arising through ordinary language terminology appears in reports carried out with scrupulous attention to objective methodology... simply as a result of the nature of our language.... Reference to a conscious subject always slips in, whatever the disinfecting precautions, simply because language has been so framed as to carry it.” (Asquith 1984)

In other words our ordinary everyday speech is anthropomorphic. It is not neutral and non-committal as Kummer (cited by Harré & Reynolds 1984, p. 107), for example, wanted us to believe. The urge to endow animals with our mental abilities is so strong that it brought great disappointment for the several groups who tried to teach chimpanzees human-language-like skills in the 1970s (see 3.4). This same anthropomorphic urge seems to have created illusions also among students of primate social behaviour in the field. Dunbar (1985, p. 39) acknowledged that his evidence did not actually prove that animals are conscious but then added dismissively, “although anyone that can doubt it must live in rather a peculiar world”. He had prefaced his account of social behaviour in gelada baboons with this declaration: “I shall make frequent use of the language of conscious decision-making in defiance of Lloyd Morgan’s proscription of anthropomorphisms [*quoted on p. 153*]. I do so partly because this is much the easiest way, but also because fifteen years of field work have made it abundantly clear to me that strategy evaluation is precisely what the animals are doing”

(*ibid.* 1984*a*, p. 4). He felt sure this view of his was quite typical: “Most field workers – whose research places them in very close contact with their animals [primates] – have no doubt that their animals act consciously” (*ibid.* 1985; cp. Goodall 1986).

Should we then assume that these experienced workers know better than people who are sceptical about the consciousness but have seen less of the animals? Gould (1982, p. 483) thought so, and so evidently did Dunbar. Yet the considered judgement of de Waal, an exceptionally experienced primatologist quoted on this subject by both Asquith (1984) and McFarland (1989*a*), was different. He described a number of examples of “non-ritualised, intelligent forms of deception among semi-captive chimpanzees” which he said, “suggest, but cannot prove, the existence of *intentional* deception, since many of these examples lend themselves both to complex cognitive and to simpler explanations” (de Waal 1986). He then went on to make a very perceptive remark: “One factor which seems to have some effect on a scientist’s attitude about the controversial issue of animal mentality is the amount of experience he or she has had with the behaviour of non-human primates, especially pongids. The fact that absolute ‘nonbelievers’ [in animal premeditation and intentionality] are rare among people familiar with members of these species means that direct exposure to their actions has the power to convince. Rather than on the gathering of explicit evidence, this process of gaining confidence in cognitive explanations is based mainly on human intuition” (de Waal 1986). Bierens de Haan (1947) defended intuition as a means of explaining animal behaviour but today intuition by itself is regarded as unacceptably anthropomorphic. Intuitions, or “hunches got by introspection” as Bunge (1977, p. 509) called them, “must not be regarded as self-evident but as hypotheses to be subjected to objective tests”, as he said. Or note again McFarland (1989*a*, p. 147), referring directly to de Waal’s statement above: “A scientist’s hunch is acceptable as a

start, provided that it leads to a theory that can be rejected in face of the evidence." A cognitive explanation based on no more than intuition cannot be given that Popperian test. It is anthropomorphism pure and simple.

In the event, when discussing whether it is useful for observers to make the assumption that higher animals are conscious, Dunbar effectively confirmed de Waal's point about the intuitive basis of cognitive explanations of primate behaviour. "In practice", he said (Dunbar 1984*a*, p. 232), making this assumption "may do no more than formalize what every good ethologist in fact already does intuitively". Elsewhere, Dunbar even paraphrased Asquith's (1984, p. 143) argument above: "the very language we use derives from human experience and, as a result, it inevitably presupposes consciousness. There simply is no 'neutral' language in which to describe the behaviour of animals that does not prejudge the issue" (Dunbar 1984*c*). Even if this is something of an overstatement, in saying it Dunbar knocked the props from under his own conviction that animals act with conscious intent.

2.7 Compulsive anthropomorphism

Why is it, then, that people persist in taking it for granted that the behaviour of animals is consciously intentional? The answer has been staring us in the face for years, and especially since Tinbergen (1951, p. 4) thought it worth mentioning the familiar fact that "introspection leads us to believe that our own behaviour is controlled, to a certain extent, by 'foreknowledge' of ends or goals". In other words the belief that our behaviour (and by analogy that of some animals too) is goal-directed and intentional is simply *built into us*. Washburn, Bonner, McFarland, R. Dawkins, Bullock, Gallup and Henry all virtu-

ally said as much in the passages quoted together above (pp. 24-5). Recently Tinbergen's tentative point has been developed quite explicitly by McFarland:

"Introspection tells us that much of our own goal-seeking behaviour is intentional, and we tend to assume that the behaviour of other people, of some animals, and even of some machines, is similar". (Ibid. 1989*a*, p. 125).

"... we are designed to think in teleological terms. This mode of thinking is useful in interpreting the behaviour of our political rivals...." (Ibid. p. 147)

"We naturally talk and think in teleological terms... we find it very hard to divorce ourselves from the purposive anthropomorphic view, which I propose to call the teleological imperative". (Ibid. 1989*c*)

Our evolutionary inheritance pre-disposes us to interpret the world in terms of meanings and purposes, as if the rivalries of our political life were relevant to the inanimate world. The result is that we attribute purpose where there is no purpose, and seek meaning where there is no meaning." (Ibid. 1989*c*)

The child asking "What is the purpose of flies?" is not alone in thinking there has to be one.

It must be a mistake to believe that our behaviour is literally intentional in the sense of being controlled by foreknowledge of its end, as Tinbergen put it, since an intended end often fails to come about. Even when the actual end does turn out to be the intended one, this actual end cannot have been controlling or serving in any sense as a cause of the behaviour, for that would require a teleological reversal of cause and effect. On the other hand our behaviour could be controlled by a mental image of some end or other, whether that turned out to be the actual end or not. That after all is what 'intend' means. This process would not be teleological because here the behaviour

is not caused by clairvoyant foreknowledge of its actual end-result, but by a mental image or 'representation' of some end-result. The mental representation of an end-result precedes the brain's commanding of the behaviour, so the cause precedes the effect in the orthodox manner.

Now the only datum available to the conscious brain in formulating the intention consists of the learned association between the given behaviour and a certain outcome of it. It follows that the memorized association between them must be reprocessed in such a way as to invert the order of events before it is presented to the 'inner eye' of consciousness, so that the mental image of the outcome comes to precede the behaviour. Such an inversion should be well within the human brain's capacity for signal processing; especially since, as R. Dawkins (1989, p. 141) said, natural selection would favour the development of "our goal-seeking capacity...an immensely useful piece of brain technology". The neurophysiological capacity for such inversion could well have been the key new feature that enabled *Homo sapiens* to 'take off'.

McFarland (1989*a, b*), however, has mounted a major attack on the belief that there is such a thing as truly 'goal-directed', intentional, behaviour in animals or even in people. He does not accept the usual view that mental goal-representations play a causal role even in our own behaviour. Here he parted company with Weiskrantz (p. 19) and many others including his fellow participants in a lengthy debate on goal-directed behaviour (Montefiore & Noble 1989). McFarland's argument against goal-directedness is based on the inevitability of frequent 'trade-offs' between the competing behavioural demands on an individual in any real-life situation. This he argued would be incompatible with effective goal-direction, since that would require active exclusion of all other goals from any role in the direction of the behaviour. "Such trade-off is incompatible with the essential design feature of goal-directed

behaviour, because active (goal-directed) control systems are designed to eliminate the influence of extraneous variables, whereas the essential feature of trade-off is to allow such influences" (McFarland 1989*a*, p. 123). That may be so in animals, but R. Dawkins on the other hand is convinced that human brains are (uniquely) able to combine "flexibility in setting up new goals, coupled with tenacity and inflexibility in pursuing them.... What natural selection has built into us is the *capacity* to strive, the capacity to seek, the capacity to set up short-term goals in the service of longer-term goals" (R. Dawkins 1989, p. 142).

Moreover, if consciousness makes mental images, and therefore intentionality, possible as I suggested above, then, in the case of people and only of people, the argument that goal-directedness is teleological loses its force. In fact, McFarland (1989*a*, p. 147, quoted on p. 29, above) described our teleological mode of thinking as useful in interpreting the behaviour of our fellows, in agreement with Weiskrantz and Penrose (p. 20). To be useful, our teleological thinking has to influence our behaviour. If it does not influence our behaviour, then we are not using it. And to survive under natural selection it must have influenced our behaviour.

It is not very difficult to imagine what may have promoted the evolution of our in-built empathy with animals. Once we had evolved this empathic awareness of the feelings, thoughts and intentions of our fellow human beings (p. 21), then there could have been positive selection for extending this way of thinking to cover animals, during the hunting and domestication of them, and no selection against extending it still further (4.1 and 4.2).

To sum up: although we cannot be certain that no animals are conscious, we can say that it is most unlikely that any of them are. Science does not deal in certainties but in order to keep going it must adopt working hypotheses, the most

plausible at the time. These are by common consent treated as 'true' until replaced by more plausible ones. It is in that spirit that anthropomorphism is treated here as a definite mistake. In point of fact, the hypothesis that animals are conscious is not a scientific one, since it cannot be tested.

Once arrived at, that verdict is promptly confronted by the entrenched, age-old, anthropomorphic belief that animals are conscious and purposeful. This seems to be one of the things built into human beings by both nature and nurture so that we cannot hope it will simply fade away. Many neobehaviourists will not be as ready as I am to take an uncompromisingly negative view of animal consciousness but the case against anthropomorphism does not depend on that view. Readers' unwillingness to accept that argument does not mean that they are prepared to go to the other extreme and *assume* that animals are conscious. My main purpose here is not to persuade people that animals are unconscious but rather to bring out the danger of unthinkingly assuming that they *are* conscious. All of us without exception, including those who are convinced intellectually that anthropomorphism is a mistake, remain in danger of falling into it without noticing (e.g. p. 8). Clark Hull was a radical behaviourist and as such is out of favour nowadays, but that does not invalidate his warning: "Even when fully aware of anthropomorphic subjectivism and its dangers, the most careful and experienced thinker is likely to find himself a victim to its seduction. Indeed, despite the most conscientious effort to avoid this it is altogether probable that there may be found in various parts of the present work hidden elements of the anthropomorphically subjective" (Hull 1943, p. 27). Admittedly that is a danger that most neobehaviourists no longer take seriously. They consider that the battle against anthropomorphism was won and has passed into history. The following Chapters 3 to 6 present grounds for questioning that view and it will be returned to in Chapter 7.

CHAPTER 3

3.1 Instinct

The history of ethology must be almost unique. Its founders were awarded a Nobel Prize, which they richly deserved, and yet the theoretical core of the discipline as they founded it survived only a few decades. Most of the overhauling occurred in the 1950s and took the form not so much of revising that original theoretical core, the theory of instinct, as of simply demolishing it, leaving nothing of comparable generality in its place. By 1968 the theory of instinct put forward by Lorenz (1937, 1950) and Tinbergen (1950, 1951) and commended by Thorpe (1948, 1954), could be alluded to by Bateson, then a seasoned editor of *Animal Behaviour*, in the following terms:

"Worship of the old gods and the intellectual baggage that went with it still survives quaintly in odd corners. But for the most part proponents of a Grand Theory have either been forced to close their eyes to awkward evidence or modify their ideas to the point of unfalsifiability. Explanations have thus become more limited in scope. (Bateson 1968)

This was not an unfair judgement. It has been echoed by R. Dawkins (1976*a*) and Barlow (1989) and repeated recently by Bateson & Klopfer (1989). Ridley (1982) even described a book in which Lorenz (1981) defended his original ideas, as "awkwardly antediluvian".

The 'Grand Theory' held that each major behavioural system was driven from within by outward-flowing nervous "energy" (Lorenz) or "motivational impulses" (Tinbergen)