

An Introduction to Animal Cognition. By John M. Pearce. Hillsdale, New Jersey: Lawrence Erlbaum (1988). Pp. viii+328. Price £8.95 paperback.

For a number of years, psychologists who conduct experiments with laboratory animals on such topics as conditioning, maze learning and perceptual discrimination have been interpreting their results in terms of cognitive processes which are more elaborate than reflexive associations. Although there have been useful collections of chapters to mark the trend, such as Roitblat et al (1984) and Weiskrantz (1985), a coherent summary of it in an undergraduate textbook would be valuable. Pearce has attempted to provide this by organizing his book around the subsidiary theme of evaluating the relative intelligence of different species. This is a topic fraught with difficulties. Macphail (1982, 1987) has proposed that all non-human vertebrates are equally stupid, but has yet to convince many commentators that this is a constructive position to take. Pearce's equivocation in his treatment of Macphail's Null Hypothesis supports one's suspicions that a global notion of intelligence is not likely to be helpful in the examination of the information-processing capacities of animal species, but the issue may serve the purpose of engaging the attention of student readers.

The substance of the book begins with Chapter 2 on *The Representation of Stimuli*. Internal representations are said to be the fundamental units of animal cognition. This is an accurate reflection of contemporary wisdom, although introducing the concept by reference to experiments on *Paramecia* and using representation and memory interchangeably may not be the best preparation for the very brief discussion on the neural coding of stored information later in the chapter. A separate chapter on memory ends with the conclusion that there is a striking similarity between the memory processes of different species and the chapter on associative learning concludes with references to studies of Pavlovian conditioning in *Paramecia* and *Limax*, but with the examination of experiments on selective attention Pearce begins to entertain the possibility of demonstrable species differences in cognitive capacities. Instrumental conditioning is analysed under the heading of *The Translation of Knowledge into Action*, and there are further chapters on *Problem Solving and Reasoning* and *Communication and Language* in which Premack's speculation that primates form more abstract representations than other mammals is considered and an appropriate variety of complex training experiments with chimpanzees is described. On the basis of the evidence from chimpanzees, Pearce suggests that there are reasonable grounds for believing the some animals possess at least the fundamental thought processes necessary for language comprehension and production (p. 283). It is no surprise therefore, when, in the final chapter on the distribution of intelligence, Pearce expresses reservations about the Null Hypothesis for species differences in cognition.

Although in these final pages Pearce refers to the possibility that the cognitive characteristics of a given species may be influenced by the demands of the ecological niche it occupies, readers of this journal should be warned that he virtually ignores the ethological questions of evolution, development and function — Lorenz, Maynard Smith and Krebs for instance are noticeably absent, and though there are references to homing there is little on reproduction and social behaviour and nothing on optimal foraging. However, the book is written in a clear and straightforward style, and is well illustrated with figures and line-drawings. It may therefore be recommended as an introductory survey for the material it covers.

Stephen Walker
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