

establish intensive breeding units. Amphibians are also comparatively well-suited to reintroduction back into the wild, although how we solve the environmental problems which caused the original decline is a far bigger task. Captive populations may be the only way, in the short term, to save many amphibian species. But amphibians do require a high level of skill and care to maintain and breed them in captivity, especially with the problems of disease control. The zoo community has made good progress with sharing information on this captive management, and this book makes a considerable contribution. It starts with brief review papers on the causes of population decline, and the various organisations and initiatives currently in place to tackle this problem. Welfare issues are directly addressed in two chapters with good practical guidance on how to maintain water quality for animals in captivity, and on disinfection of waste water and prevention of disease transmission. There is a particularly useful review of the limited information available on those amphibian diseases that are associated with their decline. There are a number of papers on breeding and behaviour of various individual species in captivity, and another group of papers concerning *in situ* projects. These include a good account of the collaborative efforts by American zoos to save amphibian species in Panama, during which it was found that there were actually two species of the Panama golden frog, both sadly now extinct in the wild. Other papers highlight our poor knowledge of the status of amphibian populations in Africa and Southern Asia. The remaining papers cover a wide range of unrelated zoo subjects, including the captive breeding of Komodo dragons, the release of captive bred orang-utan, the Iberian lynx conservation programme, and a survey of dental treatment of zoo animals. As is usual in this annual publication, about half of the volume is occupied by a reference listing for zoo professionals of the major animal collections around the world, their staff and summary holdings, zoo associations and international studbook holders. To their credit, the Zoological Society of London provide free access to this whole publication online to all developing countries.

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Beautiful Minds: The Parallel Lives of Great Apes and Dolphins

M Bearzi and CB Stanford (2008). Published by Harvard University Press, Fitzroy House, 11 Chenies Street, London WC1E 7EY, UK. 329 pp Paperback (ISBN 978-0-674-02781-7). Price £16.95, €18.50, US\$24.95.

Dolphin, great ape and human brains are among the largest on the planet, relative to body size. Although members of these species live very different lives in very different habitats, their lifecycles are strikingly similar. Offspring are dependent on adults for long periods, reach reproductive age relatively late, and live long, socially complex lives. Do these similarities constitute a foundation for a convergent evolutionary path that leads us to share advanced cognitive

abilities as well? The authors of the book *Beautiful Minds: The Parallel Lives of Great Apes and Dolphins* compare the mental lives of dolphins and great apes and discuss the possibility that certain cognitive similarities have emerged as a result of the complexity of each species' social lives.

Dolphins and great apes were chosen because of the authors' respective scholarly passions, and their belief that great apes and dolphins are among the 'most cerebral' of our planet's species, being 'second only to humans' in cognitive capacity. The authors, Bearzi and Stanford, even state that "we anthropomorphize when we attribute humanlike smarts to *any creatures other than dolphins and great apes*" (p 263, our italics). Many psychologists and biologists would disagree with the claim that attributing humanlike intelligence to dolphins and great apes is not anthropomorphic. Even if it is not anthropomorphic, the tendency to equate ape and dolphin mental capabilities with that of humans is problematic. It sets human cognition as the standard, and subsequently minimises the mental capabilities of species that may be perfectly adapted to their environment but fall short of the human standard. In addition, it sometimes causes investigators to make spurious comparisons. For example, the claim that ape gestural language is "equivalent to the speech of a two-year-old child" (p 174) is common among ape-language researchers, but has no basis in fact. Two-year-old children's language skills far outshine those of any ape or dolphin, most likely because in such studies apes and dolphins are required to learn a human-derived system (Herman *et al* 1984; Kako 1999). Rather than comparing animal's abilities in such situations to those of human children learning their native tongue, we believe that the field of comparative cognition is better served by attempting to understand how and why animals solve the arbitrary communication tasks that humans present to them. Abandoning the unfruitful attempts to equate human and ape (or dolphin) cognition also opens the door to much-needed comparisons with other species. A border collie has been shown to comprehend over 200 human object words and also demonstrated an ability to learn novel words by spontaneously pairing them with novel objects (Kaminski *et al* 2004), which certainly casts a large shadow on claims that only great apes and dolphins possess the cerebral ability to learn aspects of human communication systems (see also Irene Pepperberg's work with Alex, an African Grey parrot, eg Pepperberg 1994). Although no animals, to date, demonstrate linguistic abilities to rival those of humans, we think that comparing individual animal's performances when presented with these sorts of communication problems is crucially important. By doing so we might earn a deeper understanding of the effects of personality and its potential implications for different species on this sort of problem solving.

We are not advocating the abandonment of comparisons with humans. On the contrary, we believe that humans are an important comparison species because so much is known about our abilities (albeit far from everything), but also believe that it is problematic to set human abilities as the standard against which other species are judged. Even if the main goal of comparing other species to humans is to learn

more about human cognition *per se*, and to better understand how human cognitive abilities emerged during evolution, it is still important to remember that what might be evolutionarily relevant for one species might be totally irrelevant for others. The authors also seem to recognise this. On p 66, they argue that “if we are to understand these societies, we probably need to revise our concept of intelligence and learn to think outside our species”. Given this statement, it is surprising to find comments such as the dolphin’s lack of hands “is their eternal drawback in the evolution of primate-like intelligence” (p 250). This statement is exceptionally primate-centric and at odds with the sentiments of the authors’ concern with revising our human-biased concepts of intelligence. What we hope the authors meant by this statement is only to point out that we would be wrong to expect to find cognitive abilities strongly connected to the use of hands in dolphins rather than that the lack of hands is an evolutionary ‘drawback’ for dolphins as a species.

Given our interest in comparing the mental lives of various species, we looked forward to the authors’ efforts to compare the minds of great apes and dolphins. And there are certainly aspects of this book that lived up to our expectations. There are nice overviews of early fieldwork with dolphins and apes. In addition, the discussion of chimpanzee meat hunting/sharing and the discussion of chimpanzee male dominance are well done. The description of the social structure of bonobo societies and the comparisons of this with other primate species provides an excellent summary of the different social structures found in different regions and different primate species. We particularly enjoyed the emphasis on cognitive flexibility that appears in various places throughout the book (sharing that bias ourselves, eg Kuczaj & Walker 2006; Kuczaj & Makecha, in press), and agree that the evolution of flexible cognition in these species was likely driven by the need to successfully negotiate complex social relationships and situations.

The authors discuss various behaviours that evidence flexibility in great apes and dolphins, including male-male alliance behaviour in chimpanzees (see p 197) and dolphin social networks (see pp 205–206). However, there are certainly limits to each group’s cognitive flexibility. For example, male orang-utan mating strategies are discussed on p 84. Evidently, male orang-utans attempt to maintain a sexual monopoly over several females, but are unsuccessful because of their limited mobility. One has to wonder why a failing strategy persists or even if it is truly unsuccessful. If it is, then male orang-utans appear to have limited flexibility when it comes to mating strategies. Similarly, chimpanzee tool use appears to reflect local traditions with limited flexibility (eg chimpanzees may use sticks to fish for ants but not for termites, see p 219). An understanding of the role of cognitive flexibility in the lives of great apes and dolphins requires an appreciation of the boundaries of such flexibility as well as an appreciation of the role of individual differences. Flexibility allows animals to adapt to novel situations and to devise novel solutions to existing problems. Just as species differ in their flexible abilities, so do individuals

within a species. Both great apes and dolphins evidence personality differences (Gold & Maplem 1994; Gosling & John, 1999; Highfill & Kuczaj 2007), but little is known about how these differences affect an individual’s flexible prowess. In fact, surprisingly little is known about the individuals within a group that contribute with innovative behaviours to the group’s repertoire or the individuals who are most likely to copy other’s innovations (Poirier & Fitton 2001; Kuczaj *et al* 2006). This information is important for the study of culture as well as the study of cognitive flexibility. One of the issues in the study of animal culture is the speed with which innovative behaviours spread throughout a group. We suspect that this is affected by both the nature of the innovator and the composition of the group — as we have noted elsewhere some models appear to be more salient than others (Kuczaj *et al* 2006; Kuczaj & Yeater 2007).

The authors note that we must be cautious in our interpretation of results from the studies of the cognitive and social abilities of captive animals. The captive environment is certainly different from the wild one (a truly admirable job is made of pointing out the rapid destruction of the natural habitats for great apes and dolphins — a point that could be made for all species on earth, for that matter). Nonetheless, studies of captive animals are important for the claims in this book (eg Herman’s work with dolphin comprehension of gestural strings, Herman *et al* [1984]; the spread of hand-clasp grooming among chimpanzees at Yerkes, p 227). In fact, we wish more space had been devoted to the considerable literature on ape and dolphin cognition. The best understanding of ape and dolphin minds should be the one that comes through integration of all available data, regardless of whether it comes from studies of captive animals or naturalistic field studies. In addition, new technology such as that used to study the cognitive implications of dolphin echolocation by Starkhammar *et al* (2007) and Amundin *et al* (2008) can be used with both wild and captive dolphins, and will help us learn more about the inner lives of these animals. We suspect that the intended audience for this book is the educated public rather than the scientific community, and that the abbreviated considerations of many topics reflect this intention. One problem with this approach is that hypotheses are sometimes stated as facts, which can mislead a naïve reader. Statements such as “joy seems to be contagious among dolphins” (p 30), dolphins exchange ‘voluminous’ amounts of information (p 73), “silverback gorillas live in fear of their females walking out one day” (p 83), and killer whales “always choose sexual partners with different dialects” (p 125) give the impression that these are proven facts, when this is not the case. These are intriguing and important hypotheses, and may well prove to be true, but should not be mistaken as facts at the present time. Similarly, the discussion of the dietary specialisations of resident and transient killer whales on p 72 might lead the naïve reader to assume that the killer whales made conscious decisions to specialise on fish and marine mammals, respectively, an interpretation we are sure the

authors did not intend. The statement “Hunting, meat-eating, and tool use were all traits thought to be uniquely human” on pp 56–57 is also confusing since both hunting and meat-eating are critical for most predators. Maybe it was once considered to be uniquely human among primates, but that statement seems extraneous since the scope of the book focuses on comparing species across taxonomic borders. There are a few other confusing (and sometimes contradictory) statements in the book. On p 123, it is stated that dolphin males in primary and secondary alliances are kin, while on p 207 we read that such alliances are ‘strategic friendships’. The reference to a business book that purports that dolphins are ‘ideal negotiators’ is confusing at best, and potentially quite misleading to a naïve audience. The claim that psychology was founded as a ‘uniquely human discipline’ will surprise many psychologists, especially given the rich history of comparative psychological studies.

The authors are to be commended for their description of the challenges facing great apes and dolphins if they are to survive in their natural habitats. These include the possible impact of whale watching on cetacean behaviour and the bush meat trade on great apes. Although solutions to these environmental issues remain elusive, it is important that discussions occur if we are to ascertain the best and most realistic ways of improving the well-being of animals whose lives are increasingly affected by human activities. They also discuss the psychological needs of animals that are housed in captivity, a topic of increasing concern as the survival of many species in their natural habitat becomes less certain.

Despite our concern with certain details, we recommend this book. Readers will encounter considerable food for thought, including interesting facts, ideas and discussions regarding the inner lives of two different but equally amazing members of the mammal kingdom. However, we also encourage readers to remember that many of the issues addressed in the book are, in our opinion, more complex than the book suggests. Nonetheless, an interesting and readable book has been written on other species’ minds. Those of us interested in comparative cognition want to know how animals make sense of their world, and this book conveys some of the excitement we experience when we gain another glimpse into another species mind.

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The Welfare of Cats

Edited by I Rochlitz (2007). Published by Springer, PO Box 17, 3300 AA Dordrecht, The Netherlands. 277 pp Paperback (ISBN 978-1-4020-6143-1). Price £30.50.

This book is the cat volume in a series of academic texts focused on the welfare of the major domesticated species. Edited by Irene Rochlitz, it presents a comprehensive review of feline welfare issues over ten chapters.

Chapter 1 presents an overview of feline behaviour by Sharon Crowell-Davis, essential reading in order to understand welfare problems and to intervene successfully. Origins, social organisation, methods of communication and behavioural development are covered from both inter-specific and intra-specific perspectives.

A good account is made of the domestic cat’s sociality given there is often confusion about whether the cat is truly social or more naturally asocial. The reality reflects the cat’s adaptability; having the skills to be social when clumped resources permit but also able to exist independently when resources are dispersed.

Chapter 2 moves on to the assessment of feline welfare. The authors, Rachel Casey and John Bradshaw, assume that emotions accompanying the cat’s mental processes determine its welfare. Given the solipsistic nature of emotions, two indirect means of assessment are described: i)