influenza can have on animal suffering is emphasised. The influence of European Union Directives on changes in pregnant sow housing from individual to group systems and the increase in weaning age is noted. Some information on relative health and welfare issues in organic compared with conventional farming is reviewed in several chapters.

A chapter on molecular genetics provides a useful overview of this important area. Examples are provided of the relevance of this area of research in understanding important welfare issues in the dairy industry, such as mastitis and calving difficulties associated with calf size. There is also a useful review of research in animal biotechnology, where one potential application of this work is the development of disease resistance that would be beneficial for animal welfare. Areas of interest in research on ruminant nutrition included the importance of fibre in the diet to reduce the risk of ruminal acidosis that can lead to pathology and illness. In a chapter on meat quality, animal welfare is given equal weight to other factors influencing meat quality. However, the discussion is limited and mainly confined to risk factors for DFD (dark firm dry) meat and the effects of handling and transport on pork quality. In the chapter on dairy cattle, research on the role of neutrophils in relation to mastitis (a major welfare issue) is described. Also of interest is the discussion on factors affecting the decline in the fertility of dairy cows. There is a prominent section on behaviour and welfare in the chapter on pigs. A diverse range of topics ranging from research on the use of straw; reduction of piglet crushing by sows; farrowing sow environment; castration, tail docking and teeth resection, stocking density; and influence of handling on responses to transport and pre-slaughter conditions are discussed. A smaller section in the chapter on sheep and goats identifies the importance of the capacity for 'sentience and emotions' in animal welfare discussions. Several routine management procedures, including shearing, castration, tail docking, dehorning, vaccination, herding and transportation are listed as stressful to sheep and goats. The influence of training on reducing the responses of horses to fearful stimuli and the importance of group housing on the development of social behaviour of young horses are given emphasis.

A chapter on biometeorology made interesting reading. The importance of an understanding of the thermal responses of animals to long distance transportation and of grazing animals in arid and semi-arid regions is emphasised. An example of the use of behavioural monitoring of pigs (eg huddling) to automatically adjust the temperature via heaters and fans is cited. Potential consequences of climatic change on animals, such as changes in feed availability, extreme weather, and the distribution of animals, animal diseases and pests are identified.

Many of the statistics contained in the book can be found by consulting the FAO (Food and Agriculture Organisation of the United Nations) website (www.fao.org). The section on statistics shows trends in livestock numbers from the 1960s to 2005. With the exception of horses and sheep, the graphs show the same general pattern of a rapid rise in livestock numbers from the 60s to reach a plateau in the 90s or after 2000. This pattern is an approximate reflection of the increases in the size of the human population. However, the trend for increased milk and meat production had not reached a plateau by 2005.

Although the previous edition in 2005 contained an article on food prices and animal welfare, animal welfare does not merit a chapter in either the section on achievements of research or contemporary issues. We can only hope that it is deemed to be sufficiently important a topic in worldwide animal production and animal science to feature in subsequent editions of this book.

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International Zoo Yearbook, Volume 42

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The 2008 volume of the *International Zoo Yearbook* focuses on amphibian conservation. There is currently great concern about amphibian populations globally, about which we still know very little. Of the approximately 6,200 species, the conservation status of about a third are listed by IUCN as threatened with extinction. This makes amphibians the most threatened of all animal groups. An equally alarming figure is that about a quarter of all species are classified as data deficient — which means we have little idea of their status in the wild, which also makes amphibians the vertebrate group about which we have least conservation knowledge. It is comparatively recently that we have become aware of the scale and speed of amphibian extinctions. Some populations are declining so fast in the wild that captive breeding will be the only way to save the species, and this is a role in which zoos internationally are increasingly involved. So this volume is a very welcome source of information. We still know surprisingly little about the cause of this global amphibian decline. Alongside the familiar problems of habitat destruction, climate change, pollution and introduced predators, there are some factors to which amphibians seem especially susceptible. One is the effect of the increase of UVB radiation, which can not only kill amphibians, but also weakens their immune systems and other physiological functions. Another is the spread of unusual and fatal disease organisms whose significance has only recently been recognised, such as chytrid fungus and ranaviral infections, where human activity may be a main cause of disease spread. It is likely that several of these factors interact, making amphibian conservation particularly intractable.

Grasping for any good news in this sad saga, amphibians are particularly suitable for captive breeding. Many species lay large numbers of eggs and, whereas in the wild the young would normally face heavy mortality, if managed well in captivity the potential for rapid population increase is considerable. Amphibians, being small and with modest housing requirements, do not require high capital outlay to

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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 show 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