

reader interested in the topic the book does provide a useful reference to a selection of US literature.

The third chapter in this section on alternatives centres around animal anatomy, where models, simulations and video discs are involved, but it also suggests that the discussion of ethics should be integrated into science lessons. This is a further point that I would strongly condone, although it appears that the author is reluctant to accept that some students might make up their own minds to use animals in a number of ways which she sees as unacceptable. The author does make a good case for using alternatives on cost-efficiency grounds but there may, however, be other reasons that need to be taken into account.

The third section of the book, dealing with the implications, is where the coherence and flow within and between chapters breaks down. All chapters within this section of the book comprise loosely linked materials from a wide range of sources. In chapter 8 the sources are students recounting their experiences of dissection while in chapter 9 contributions from those who 'braved the system and won' are included. Chapter 10 reports on organizations run by groups of psychologists, medics and vets, who are against live animal use in experiments that would all qualify as regulated procedures under the Animals (Scientific Procedures) Act in the UK. Chapter 11 contains a collection of statements from a range of other professionals with regard to their feelings about the use of animals in education. The final chapter provides plans of action for High School/University students who wish to request alternatives to dissection.

The final 80 pages consist of appendices and a bibliography. For those who wish to follow items of American State Legislation relating to dissection, some parts may prove useful.

Overall, the book is of very specialist interest. It does not have an easy reading style and in many places a coherent theme is not followed. The final chapters are collections of loosely connected material that is presented without analytical comment. For me the book was sloppy. It contributes little to the dissection debate.

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Dolphins

Peter Evans (1994). Whittet Books Ltd: London. 128pp Paperback. Obtainable from the publishers, 18 Anley Road, London W14 0BY, UK (ISBN 1 873580 13 4). Price £7.99. The real world of dolphins, porpoises and small whales is described by one of the senior British mammalogists. The text is written particularly from an ecological point of view, giving not just the 'what' but also – as far as we know at present – the 'why'.

Some controversial matters, such as hunting, are simply reported in a factual way. However, as readers of recent issues of *Animal Welfare* will be aware, the Faroese do not kill pilot whales 'with a long knife called a "gaff"'. The gaff (shown in the illustration on page 84, wielded by an extraordinarily fierce looking man) is used to secure the animal, while the killing is done using a traditional knife, with a 15cm blade. The section on captivity, another controversial subject, is somewhat spoiled by repetition of the received opinions that captive dolphins 'generally suffer sensory deprivation and stress causing various

psychological disorders such as stereotyped behaviour, aggression and self-inflicted injury'. Although such statements are widely believed, there have so far been no comparative scientific studies to establish their truth or otherwise. The remarks about mortalities during capture, transport and early captivity only apply to some early, unregulated operations.

The figures for dolphin mortality in the Eastern Tropical Pacific tuna purse-seine fishery are out of date (pages 88–90). Mortality was reduced by 97 per cent between 1986 and 1993, when only 3600 individuals were killed. This was achieved through international cooperation on inspection and training without major changes in gear or operation, and still with 50–80 per cent of the yellowfin tuna tonnage taken in nets set on dolphin schools. The level of take, from the different dolphin stock involved, is now estimated to be sustainable, and all the stocks have been stable for a decade. Interestingly, it now appears that rendering this fishery entirely 'dolphin-safe' may have undesirable consequences for the ecosystem as a whole. Setting on dolphins produces tuna of the optimum size to maximize yield per recruit, as most tuna are sexually mature (mode 25–60kg) and few (4%) undersized fish have to be discarded. Fishing in other ways produces much smaller tuna (mode 2–10kg) which are sexually immature, and 29 per cent have to be discarded. The bycatch of other species (sharks, rays, mahi mahi, wahoo, billfishes, sea turtles etc) are several orders of magnitude lower when setting on dolphins (Hall M A 1994 In: P G H Evans (ed) *European Research on Cetaceans* 8: 42–46).

The explanation of the idea that cetaceans may use the contours of the earth's magnetic field as a travel aid is muddled and inconsistent (pages 40 and 79–80). This idea of mine has nothing to do with the directional components of the field (north, south etc), but concerns potential use of the shape of the local total field (flux density), which is determined by the local geology. I like to picture the animals following the contours of this local field, as if one was walking along the side of a hill, keeping one foot up the slope and one foot down. My colleague, Joe Kirschvink, who has found similar results in his examination of stranding sites and of the routes of travelling whales in eastern USA, prefers to describe this as following lines of least geomagnetic change. The strategy appears to be general, and not related to areas of particularly high or low local geomagnetism. As Kirschvink has pointed out, the reports of magnetite in cetacean brains unfortunately turned out to involve contaminants (there is a lot of magnetite about, and extraordinarily clean techniques are required to avoid artefacts). The experiments with captive animals were designed to explore the possibility of a geomagnetic torque receptor, such as magnetite. The failure of these experiments, however, does not exclude the possibility of an induction receptor (which picks up changes in the field as the animal swims through). Such a receptor would theoretically be efficient in sea water, but not in air. Recently, Martyn Brabin and Richard Frew, in New Zealand, have reported that their live-stranding sites do not conform to the idea that the animals are following geomagnetic contours on to the shore (*Marine Mammal Science* 1994 10(2): 195–207). Maybe cetaceans in the Southern Hemisphere do it differently, or maybe this is just a matter of differences in method. It will be interesting to see.

By the way, the idea that animals may use geomagnetic cues only explains why live-strandings seem to occur in the particular places which would be dangerous for animals using this strategy. Perhaps the broader situation is something similar to our road accidents, which can involve the old and young, singles and groups, the sick and the healthy. However, we can discard the idea that distortion of echolocation signals in shallow water is a cause of live-

strandings. The echolocation of small-toothed whales is specialized for hunting at comparatively short ranges, and is particularly well adapted for picking one fish out of a school. It is simply not suitable for the long-range exploration of the environment necessary for orientation when travelling. On the other hand, some of the low-frequency calls of baleen whales (which hardly ever live-strand) would be suitable, for example, for picking up something the size of Bermuda at a range of 100 miles or more, but we do not yet know whether such calls are really being used for this purpose.

Although the sounds made by dolphins are described in some technical detail (55–59), their use of body language for communication is passed over very rapidly, with only a few words about surface behaviour. Below the water they show a great variety of communication through body position. The possibility that dolphins might use their known sense of taste to gain information about the reproductive status of others, or about the presence of food, is not mentioned either. The only dolphin with strong back teeth for crushing hard-bodied prey is the boto or Amazon river dolphin (page 43).

Although this book is not particularly cheap, the whole presentation is disappointing. The attractive black and white illustrations by Euan Dunn have not printed at all well on the rough yellow paper. This is a great pity, because Dunn's animals look much like the real thing, with bone and muscle, and he has captured something of the individual spirit of each species. So often one sees drawings where the dolphins look like balloons, with silly grins, great big eyes, and identikit tails and flippers. The editing is careless, particularly in the diagrams. For example, on page 111 we have 'Boro' for 'Boto' and 'Baisi' for 'Baiji' in the diagram, although the spelling is correct in the text. In common with all the diagrams using world maps, the placing of area indicators is very rough and at times misleading. One wonders why some diagrams are there at all. For example, the diagram on page 99 is not referred to in the text, and has no legend to explain what it is about. One set of figures seems to refer to average DDE concentrations in different 'dolphin' tissues (but the top set or the bottom set, and which species?). DDE is not mentioned in the text, so readers are expected to know that it is a derivative of DDT. On the other hand, some diagrams, such as that showing an example of bottlenose dolphin group structure on page 53, are clear and helpful.

Overall the author has not been well served by the publisher and editor. The aim seems to have been to produce a book considered suitable for the general reader. Hence the frustration of not having references for statements in the text, so readers cannot follow up specific points, and the currently fashionable layout with sections of text in boxes. Unfortunately, the box text and the main text are not always well integrated, resulting in some repetition as well as some conflicting information and gaps. The text itself contains far too many unexplained technical terms, and there is no glossary. These are all things which should have been the subject of clear editorial policy and control from the outset. Probably the best strategy for readers new to the field would be to use this book and the companion volume *Whales*, also written by Evans, as a way of updating the solid background and broader explanations in Peter Evans' excellent major text book *The Natural History of Whales and Dolphins* (1987 Academic Press: London).

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