

was fostered by amateur ornithologists who wrote for the public in an enthusiastic and accessible style, and by the existence of youth organizations that encouraged the study of nature and life outdoors. Tinbergen's earliest publications were detailed observational accounts of aspects of bird behaviour. Although he was not principally concerned with the welfare of animals, the whole ethos of behavioural observation was one of respect for the animal and its environment, and a rejection of the specimen-gatherers that had dominated the field of zoology prior to this.

This predilection for field studies was apparently continued during his education at Leiden University, where he combined the skills of observation with that of carefully planned experimentation. In this period, the ideas on the role of stimuli and of releasing mechanisms, one of the concepts that we remember Tinbergen for, began to take shape. However, the book asserts that it is not until his collaboration with Konrad Lorenz that Tinbergen's work moved from being observational to being based on hypothesis testing, and to the formulation of scientific theories. In this period, the study of displacement activity was raised from the level of documentation to one in which the research tested working hypotheses and interpreted the results in terms of more global criteria. Similarly, the formulation of the principle of the hierarchical structure of instinct was the result of an integration of field work with conceptual ideas about the control of behaviour. The new structure gave those with an interest in observing the habits of wild animals some scientific background. The result was that this new field attracted students and the interest of many scientists so that by the time Tinbergen's most influential book, *The Study of Instinct*, was published in 1951, ethology had become a scientific pursuit in its own right.

The book not only traces the academic progress of Niko Tinbergen, it also documents the influence and progress of other people in the field. A chapter is devoted to setting out the theories animal behaviour and instinctive behaviour that were held when Tinbergen and his colleagues entered the field. In the following chapters there are small biographies of those associated with Tinbergen and his studies, such as Bierens de Haan, Makkink, Kortlandt, Lorenz and Baerends. What is made clear is that the work of Tinbergen was not only fostered by positive collaborations with like-minded colleagues and students, but also honed and refined through the criticisms of those who disagreed with his viewpoint.

The book is well written and easy to read, and provides an interesting insight, not only into the development of ethology, but also to the processes that shape the emergence of a new scientific field. It is only marred by a lack of complete translation of the quotes in Dutch and German for the benefit of English readers – and there is a little repetition of material in the chapter structure. *The World of Instinct* will appeal not only to those interested in the history of science, but it also provides a new perspective on the background of ethology.

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The Welfare Ark: Suggestions for a Renewed Policy in Zoos

Koen Margodt (2000). VUB University Press: Brussels. 158pp. Paperback. Obtainable from the publishers, Waversesteenweg 1077, B-1160 Brussels, Belgium (ISBN 90 5487 243 8). Price £13.00 (plus overseas postage and packing).

Koen Margodt, in his book 'The Welfare Ark', has dealt with most of the current animal welfare issues in a measured and responsible way. However, he might have spent more time looking into the history and development of zoos' responses to animal welfare concern. He

properly highlights the absolute need for all zoological collections to place the welfare of animals, both individual and collective, at the top of their management agendas. National, regional and international organizations have a very real responsibility to promote such issues and to support legislation that requires zoos to reach and maintain a high standard in respect of all their welfare activities. There is a recommendation in the book that there would be value in the establishment of cooperative links with both animal welfare and conservation organizations. Within the United Kingdom, I have no doubt that the committee that has been chaired by the Royal Society for the Prevention of Cruelty to Animals and involving zoo and welfare organizations has proved the value of such associations over the years that it has been in operation. Links with conservation organizations are as many as they are varied in a large number of zoos. There are, therefore, many examples of good practice already in existence, but there are still far too many zoos that do not yet consider these links as important. Within the context of the European Union, however, recent legislation in respect of zoos will require even greater attention to some of these areas of responsible management of zoological collections.

I was sorry that the chapter entitled 'education and recreation' lacked detail, as this is an extremely large area of commitment in many zoos across the world. Most of the comment was on informal education, with reference to the equally important, some would say more important, area of formal education confined to just one sentence. This does no justice whatsoever to the curriculum and project-based activities for schools that many zoos are very proud to have developed and sustained. Certainly, in the UK context, the move towards environmental education has been dramatic, expensive and long-standing. The pioneering work of Paignton and London Zoos in the 1960's is perhaps outwith the time frame of this book. Taking the example of one zoo, which I know well, that of Edinburgh Zoo, it started its programme of formal education in 1973 and had welcomed just over one million pupils on educational visits by October 1998. Many zoos in the United Kingdom have taken up the provision of both formal and informal education, with over twenty collections having senior staff directly responsible for this important aspect of a zoo's mission. This does not accord with the quotation that 'The educational function certainly does not exist at the core of the mission, identity and functional operation of most Zoos (Kellert & Dunlap 1989)' – although this statement was made at least fourteen years ago! It might have been better to have avoided this aspect of zoo work other than to further emphasise the point made by the author that to be successful with the education process, formal or otherwise, a very high standard of animal welfare and enclosure design is essential. The important and sometimes controversial issue of animal handling as it relates to education programmes was not touched upon at all.

The chapter on the research role of zoos was, I am afraid, dealt with in a similarly dismissive way with only five pages devoted to an increasingly important zoo-based activity. There is no mention of the work of the New York Zoological Society, the Zoological Society of London, the Jersey Wildlife Preservation Trust or many other zoos across Europe that have associated institutes of science. Many zoos are already active in this area; I give the example once again of Edinburgh Zoo and the Royal Zoological Society of Scotland, which have developed strong links with their local universities. Indeed, in 1998, fifty students were involved in non-invasive research at Edinburgh Zoo and the Highland Wildlife Park. These students were from most of Scotland's universities, two from Holland and one each from Spain and England. Much of the research was relevant to ongoing management and many projects were concerned with the welfare of the animals in the collections. For some students, the collections provided a living resource in suitable surroundings for studies, which enhanced their observational and other research expertise. This knowledge was not

necessarily of immediate benefit to the zoo, but of importance to those who in the future might find themselves studying in *ex-situ* situations.

There is very much more comprehensive coverage of the conservation role of zoos and the impact of work undertaken in co-operatively maintaining captive populations. The need to ensure a broad genetic base within captive populations and to ensure, through as much enrichment as possible, that the behavioural repertoire of individual animals is developed and maintained is properly covered in some detail. The inevitable, although not surprising outcome of successful breeding programmes is that zoos are faced with the issue of surplus animals and how to deal with those that are not required to maintain the managed captive population. The responsibility of individual zoos to ensure that the animals they breed are properly considered is dealt with in some detail. There is a firm recommendation that animal dealers should not be used, as once animals are in their hands, the providing zoo has no real control over the circumstances that relate to the placing of their animals in possibly unsatisfactory situations. I was surprised that the very important issue of breeding as part of the enrichment process does not seriously feature in the book and I believe we can not divorce this from what is, I know, a delicate debate. It really is not good enough to suggest that surplus animals are a consequence of mismanagement. I do not believe we can properly address the issue of enrichment if we do not include some thought on the importance of animals giving birth and nurturing young. The whole question of maternal behavioural repertoires and the maintenance of genetic variability must include the experience of progeny rearing. Touching on the welfare situation in the wild, the author makes reference to a higher rate of mortality in both young and very old animals in the wild state as against those in zoos, where they of course receive a huge amount of support and protection. In managing our captive population, some serious consideration should be given to this fact as it might mirror the way we manage our own *in-situ* populations. The question must be 'what level of breeding activity is essential to the animals in captivity' and 'how is the issue of surplus stock to be tackled when addressing zoos' responsibilities towards conservation needs, against the reality of the limited resources of space and finance that can be provided'.

The five recommendations that are put forward in the concluding chapter include the need for zoos to consider or reconsider their ethical position regarding the welfare of individual animals in their care; the need for zoos to have an open attitude in making information on diets, enrichment schedules, breeding successes and mortality rates public; and the need for authorities, and by this I presume local or central Government, to be reminded of their responsibilities towards irradiation of substandard facilities. The fourth recommendation calls for a much more careful consideration of how zoos might fully meet the requirements of the animals that they keep and for zoos to have a regard for those species which do not appear to be suitable for keeping in captivity, at least under current provisions. The final recommendation is that zoos should avoid any competition with *in-situ* conservation and use their best endeavours to support activities in the wild, which will secure the future and habitat of the species which rely on them. Many of those individuals and organizations responsible for zoos will recognize that there are already many excellent examples of these recommendations having been considered and acted upon. The reality, however, is that not all zoos have signed up to managing their collections in accordance with modern thinking. In the European context, the United Kingdom has had a Zoo Licensing Act since 1981 and there is now the European Directive on Zoos, which will similarly address many of the issues highlighted in this book.

The Welfare Ark is neither comprehensive in its coverage of the issues, nor indeed is it historical in its perspective, as many of the initiatives that have been taken in respect of

welfare and enrichment that go back to the 1970's or earlier are not mentioned. However, it does represent a very useful overview of the issues that need to be addressed more widely. It is also a useful publication for those who, whilst not involved with zoos, have very proper concerns for the welfare of individual animals in the captive state. I would suggest, however, that it is very important that those individuals and organizations that wish to comment on these matters should undertake further study on a local basis to see how much of the concern expressed in this book has already been addressed and how animal management has changed to meet the welfare needs of the new Millennium.

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Reference

Kellert and Dunlop 1989 *Informal Learning at the Zoo. A Study of Attitude and Knowledge Impacts (A Report to the Zoological Society of Philadelphia of a Study Funded by the GR Dodge Foundation)*