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- How might the exhibit serve or provide special learning experiences for children, students, teachers, etc.?
- What is the integrative theme of the exhibit?
 - Education? To teach certain principles of ecology, behavior or conservation?
 - Conservation? To propagate and preserve genetic potential?
 - Research? To advance science, applied science or descriptive natural history?
- Once the theme of an exhibit has been established, have the other exhibition goals been fully integrated into the exhibit?
- Will the exhibit offer new opportunities to gain knowledge in all aspects and goals of exhibition?
- In planning the exhibit, have the appropriate experts and specialists been consulted for advice and recommendation?
- Once the exhibit exists, will the appropriate specialists and groups be encouraged to utilize the exhibit for realization of maximum benefits?
- What future uses or new emphases might be incorporated into or substituted for current uses or themes?

The Role and Responsibility of Zoos: An Animal Protection Viewpoint

John E. Cooper

Introduction

The aim of this paper is to look at zoological collections from the viewpoint of the animal and, in particular, to draw attention to areas where welfare considerations should be paramount. I do not intend to cover the capture and transportation of zoo animals although this is obviously of great importance and must be included in any overall consideration of the welfare of zoo animals. In this paper, however, I shall concentrate upon the care of the animal within the zoo environment.

From the outset I must make it clear that I am a believer in the value of zoos as scientific and educational establishments. Hediger (1950) emphasized this approach in his book *Wild Animals in Captivity* and went so far as to say: "It is not too much to claim that today the zoo is a cultural element of prime importance. Since the beginning of the scientific age in the sixteenth and seventeenth centuries it has decisively influenced the whole trend of world natural history."

Even Jordan and Ormrod (1978), in their somewhat emotive and sensational book *The Last Great Wild Beast Show*, recognized the value of the zoo and described

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it as "...a sort of Noah's Ark, complete with laboratories and classrooms." They, like other authors, attempted to dispel the myth that captivity, *per se*, is inhumane. It is now recognized that the free-living animal is far from free; rather it is severely restricted in its activities by such factors as territorial aggression, predation and competition for food.

Street (1965) in his book *Animals in Captivity*, also listed "entertainment" as a function of zoos. This is more questionable — too often in the past animals in zoos have been objects of derision and teasing, but I personally can see some merit in children (and, often, adults) gaining pleasure from watching the antics of properly housed and well-managed animals.

Having explained my personal position regarding zoos, I must go on to say that I recognize that zoos are an example of exploitation of animals. In this respect they must rank with the keeping of pets, the eating of meat, the catching of fish, the breeding of silkworms and the training of guide dogs for the blind. Our aim, as people concerned with animal welfare, is to ensure that this exploitation does not become excessive. This is easier said than done. Much depends upon the species of animal involved and the conditions under which it is kept. Some animals have a wide tolerance range while in others it is narrow. Animals born in captivity are not subjected to the rigors and stresses of capture and transportation and are likely to be better able to tolerate close proximity to man and artificial conditions. From the outset, therefore, it is obvious that we cannot generalize when talking about zoos and their inmates.

Welfare

The welfare of animals in zoos can be discussed under three headings: 1) willful cruelty; 2) neglect; 3) suboptimum management. It is not always easy to distinguish these three, but they provide useful guidelines.

Willful cruelty, as the term implies, means that there is intentional gross ill-treatment of animals, such as the "beating, kicking, over-riding, over-driving, overloading, torturing, infuriating or terrifying," listed so graphically in the Protection of Animals Act, 1911 in England and Wales. Such actions are to be condemned wherever they occur and should lead to a prosecution under the relevant legislation. In many countries of the world willful cruelty is now rare in the zoo environment. However, it should be noted that animals may be subjected to cruelty by visitors to the zoo; examples range from the feeding of unsuitable tidbits, such as sweets and cigarettes, to horrific acts of sadism such as the intentional killing or mutilating of animals. Such activities cannot be considered the direct responsibility of the zoo authorities, but they emphasize the point made earlier, *viz.* that the keeping of animals in zoos is an example of exploitation, and we must carefully consider to what discomfort or abuse we are subjecting the animals.

In this context one should also perhaps consider the thorny problem of the feeding of live food. This has long been a controversial subject, particularly when it concerns snakes. There can be little doubt that the feeding of live rodents to reptiles can cause pain and discomfort to the prey; every effort should be made to reduce it to a minimum and to ensure that any animal offered as food is treated as humanely as possible. It should not be forgotten that invertebrates are also used as food items and yet, surprisingly, little or no concern is expressed over this practice. In my view even the welfare of invertebrates must be considered in the zoo environment.

Neglect is more difficult to assess. It implies a failure to carry out an essential or important task rather than deliberate cruelty. Often the cause is ignorance. Examples of neglect were given by the Universities Federation for Animal Welfare (UFAW) in its small survey of zoos in Britain in 1970-71; UFAW drew attention to such matters as deformed hooves and infected wounds. More severe examples, some bordering upon willful cruelty, were discussed by Jordan and Ormrod (1978). Such neglect can also be countered by legal action, under the relevant welfare legislation, but prevention is better than cure and the best nonmedical preventive measure is probably the licensing and inspection of zoos (see later).

The third aspect of welfare, suboptimum management, is the most difficult to assess and to remedy. The variation between species was mentioned earlier. While a lion may appear to thrive, and probably breed, in a small and barren enclosure, an okapi or dolphin is unlikely even to survive unless offered the best possible environment and subjected to the highest standards of management. In the case of the cold-blooded animals, such as reptiles, amphibians and fish, the ability to "acclimatize" to adverse conditions is virtually nonexistent, and these animals may show clinical signs of disease due to only slight differences in temperature or humidity. Affected animals refuse to feed, develop skin and mouth lesions and secondary infections and gradually deteriorate. This "maladaptation syndrome" has long been recognized and is, regretfully, still a common cause of death in zoological collections. It and certain other conditions can be diagnosed clinically, but many less extreme examples of suboptimum management are extremely difficult to identify. As a result, recognition of welfare problems can often pose great problems.

One hesitates before mentioning "stress," as this is a term which is rarely used correctly. In addition, the concept of stress is complex and cannot be discussed adequately in a few sentences. It was Selye (1936) who first described a syndrome associated with such "stressors" as fatigue, pain, excess heat or cold, infection, parasitism and trauma. He postulated that while an animal may be able to tolerate and cope physiologically with low levels of stressors, it is unable to do so indefinitely and at a certain point begins to show pathological changes, such as a depression of the white blood cells, changes in the lymphoid tissues and gastric ulceration. Finally the animal may reach a stage of exhaustion and adrenal collapse. The true role of "stress" in the zoo is still a matter for conjecture, but there seems little doubt that as with other species, zoo animals should be protected from undue exposure to stressors. It is probable that "maladaptation" and other syndromes in animals are a manifestation of stress, the stressor being an adverse environment. Some stressors can be counteracted, to a certain extent, by the use of vitamins, minerals, antibiotics and corticosteroids, but it is far preferable to reduce the stressor to a minimum. Unfortunately, however, it is not always possible to identify such stressors and it is here that more research is urgently needed.

It will be apparent that the problem of suboptimum management is difficult to tackle when so little may be known of the requirements of the species in question. In the last century it was considered a great achievement to have kept an animal alive in captivity; many, despite having survived capture and transportation, died within a few weeks or months of arrival. This may still be a feature with some of the rarer species, but more often the problem is not one of keeping the animal alive but of maintaining it in the best possible condition and, wherever possible, of getting it to breed. The requirements for a species to breed are often more critical than the requirements for it to survive, and breeding can be considered an indicator of good

management. In this respect there is less excuse nowadays for a zoo director to claim ignorance. He or she can benefit greatly from the experiences of others. Publications such as the *International Zoo Yearbook* have done much to ensure that successes (and failures) of zoos are documented and, as a result, a zoo can benefit from the experiences of another establishment thousands of miles away. The holding of meetings, on both a national and international level, has also helped to improve communications and has enabled zoo personnel to meet one another and to come into contact with representatives from such fields as veterinary science, genetics and animal husbandry. As a result, new methods can be adopted and liaison improved, for example, to ensure that isolated individuals of uncommon species are exchanged or brought together in order to encourage them to breed.

A recent trend, which should be welcomed and encouraged, is for new zoos to specialize in certain groups—for example, ruminants, cats or reptiles—and to direct their energies and resources toward these rather than trying to maintain the wide selection of animals that is a characteristic of the older establishments. With such specialization come experience and expertise which do much to ensure the well-being of the charges. Advantage can be taken of new techniques, some of them the result of work with laboratory and domestic species, such as methods of artificial insemination, incubation and, in the veterinary field, laparoscopy for the purposes of sexing and diagnosis of disease.

Requirements

It is quite impossible, in a paper of this length, to detail the requirements for the adequate care of animals in zoological collections. Instead I should like to list some important prerequisites which must be considered in the assessment of any such establishment. These are: 1) trained, experienced and conscientious staff; 2) adequate and satisfactory accommodation; 3) optimum diet; 4) high standards of hygiene and disease prevention; 5) veterinary attention; 6) access to literature and contact with colleagues/other collections.

These points can only be discussed briefly. The staff are of paramount importance and it is no exaggeration to say that the welfare of zoo animals depends largely upon their dedication. In addition to dedication, however, they must receive training, and it is encouraging to note the trend in many countries, including Britain, toward the provision of training facilities for zoo staff. From the welfare point of view it is particularly important that this should include the recognition of health and disease and the ability to appreciate and take prompt action over pain and discomfort.

Accommodation for zoo animals has improved enormously in the past few years. Gone are many of the old-fashioned cages which afforded no opportunity for normal behavioral patterns and which were often aesthetically unpleasant. Modern enclosures take into consideration the needs of the animal and may include vegetation, pools, rocks and simulated habitats. Bars are less often seen; instead there is extensive use of glass and strong mesh and, for the larger species, of moats and ditches. Special care is always taken to ensure that there are as few dangers as possible for the animals (protruding nails or screws, toxic paints or corners in which individuals may become trapped). Zoo architecture is now a specialized subject; as Hatley (1972) pointed out, "The design of enclosures must be based on thorough knowledge of the animals' ecology and behavior, and obviously zoo biologist, veterinary surgeon and architect must work closely together."

The dietary requirements of many species are also better understood, and there is no longer any excuse for such conditions as nutritional bone disease in monkeys and vitamin A deficiency in terrapins. A welcome development has been the interest of commercial food manufacturers in the production of zoo animal diets. Such products are not suitable for all species, but provide a balanced and palatable diet, usually of high nutritional and microbiological status, for many animals.

Hygiene and disease prevention are of great importance wherever animals are kept in captivity. They are vital if disease is to be avoided in both animals and staff. Veterinary attention can be included under the same heading. Many zoological establishments have a full-time veterinary surgeon; at others use is made of a local veterinary practice. The veterinary profession, for its part, has shown much greater interest in zoo animals; 1978 marked the appearance of the first book on zoo animal medicine in the English language (Fowler, 1978). There can be no doubt that the provision of adequate veterinary services for a zoo is of great importance if unnecessary pain and discomfort are to be avoided.

Access to literature, colleagues and other zoos is essential if the director and staff are not to become isolated. The enormous increase in such communications was mentioned earlier and attention should again be drawn to the *International Zoo Yearbook*, which contains a wealth of information. There should be no excuse for lack of contact.

The criteria mentioned so far are fairly straightforward and are met by many zoological gardens in many countries of the world. But there are still appalling examples of old-fashioned zoos, operating under primitive conditions, with little apparent regard for the welfare of the animals. Such zoos are to be found in developed countries as well as developing ones. What can be done about this?

Action

In my opinion the following measures are desirable if the standard of zoos is to be raised and the welfare of their inmates improved: 1) national and international legislation; 2) registration and inspection; 3) closer liaison between zoos, animal welfare organizations and conservation bodies.

One is loath to recommend the introduction of yet more legislation. However, it is increasingly apparent that zoos must be covered by statute; tighter control is in the interests of staff and visitors as well as the animals. Yet in many countries there is little or no control. Here in Britain, for example, there is legislation concerning pet shops, dangerous wild animals kept as pets, riding establishments and dog breeding kennels, but nothing specifically applicable to zoos. Often zoos are exempt from laws relating to other animals; for example, a zoo may keep dangerous species, such as poisonous snakes and big cats, without a license. A "zoo" is loosely defined, yet is not covered by its own legislation. Such a situation is reprehensible, particularly in a country which prides itself on its concern for animal welfare. A similar situation applies in many other countries. There can be no doubt that statutory control over the establishment and maintenance of zoos, preferably coupled with registration and inspection (see later), is a vital step in helping to safeguard the welfare of their inmates. In some cases international legislation may be possible — an example is the European Economic Community (EEC), which is already looking at other aspects of animal welfare — and such standardization will be an important step forward. (Ed. Note: Legislation which would require licensing of zoos is now pending in the British Parliament.)

Registration and inspection of zoos should go hand-in-hand with legislation. The latter is of little value, *per se*, if it only serves to provide a list of zoos with no reference to their facilities and care of animals. A national register of zoos is desirable and only those establishments that are of a high enough standard should be licensed. Subsequent inspections at, say, three year intervals should be carried out to ensure that standards are being maintained or improved; if this is not the case, the license should be withdrawn. In some countries such a registration system already works well. In Britain the only such schemes are voluntary and, inevitably, tend to attract the better zoos rather than those of less high standard. The zoos on the lists of the Federation of Zoological Gardens of Great Britain and Ireland, for example, are generally those that already have good facilities and where animal welfare is an important consideration, rather than the less sophisticated establishments that could benefit greatly from inspections and advice. The composition of the inspection team is a matter of opinion, but in the case of the Federation it includes a zoologist and a veterinary surgeon, both of whom are experienced in work with zoo animals.

The final point, closer liaison between zoos, animals welfare organizations and conservation bodies is not one that can be enforced. Rather it must develop as a result of improved communications. For too long zoos have been on the periphery of the animal world, running their affairs in their own way and having few contacts with those in other related fields. Much of the misunderstanding would be dispelled if zoos were to play a more active part in debate on animal care and conservation and if bodies concerned with the latter were to make a greater effort to involve zoo staff in their deliberations. ISPA's decision to hold a symposium in 1979 on the role and responsibility of zoological establishments was a useful step in this direction and a good example of ISPA's sound and pragmatic approach to animal welfare.

In this paper I have made it clear that I am a supporter of zoos and have no wish to attack or criticize them unnecessarily. However, there is no doubt that zoos can be a source of "suffering," that is, avoidable pain or discomfort, and as such must attract the attention of all those concerned with animal welfare. However, I feel strongly that our approach should be constructive. We must press for tighter legislation and for higher standards of animal care. We must give our support to research which will aid in our understanding of zoo animal behavior and assist in the recognition of pain or discomfort. Above all, we must help to educate those concerned with zoological establishments so that the welfare of the animals takes its rightful place.

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