SOME ASPECTS OF ZOO AND CAPTIVE ANIMAL MANAGEMENT: *Paper presented at Summer Institute,Wildlife Health, IVRI, 1986*

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In India today nature and wildlife conservation have many champions, but few people actively express the potential and problems of our zoos. In fact, zoos in general have a negative image in India, even among conservationists. This low public image makes the difficult job of zoo management even more difficult and actually perpetuates the problems.

A comparison of the concept of zoo in India with the concept of zoo in America, Australia, and Europe indicates that in other countries, the zoo is synonymous with conservation. Even in the minds of the general public, zoos are seen as adjuncts to the conservation movement, and indeed they are. In India the public thinks of zoos largely as children's entertainment, and even many wildlife enthusiasts see zoos more as consumers of wildlife rather than as conservators.

The quality of our institutions reflects our concept of them. When people view the zoo as a sort of second-class entertainment, it becomes just that. Govern-ments then do not take these institutions seriously and hold back allocation of funds and services.

If people do not see zoos as worthwhile they will have no interest in working in them. In India very few people have an ambition to be associated with a zoo even as director, whereas in the west highly educated people are literally lining up for zoo-keeper positions. Most of these people are trying for the job because they are committed to wildlife conservation or because they love animals. When you have such interest, the quality of your institution reflects it.

In addition, if people envision zoos as entertainment only, they often misbehave in the zoo. You all know what a problem we have with teasing and vandalism in our zoos. No Indian zoo has a really effective education programme at this time, although some are starting activities now. In other parts of the world zoos have very highly organized education and interpretation programmes which reach many thousands of visitors and, through outreach programmes, other people in the community. Most people in every country visit zoos for the same reasons that is, for recreation and entertainment. But when they visit a zoo with an interpretation pro-gramme they will have been educated as well as entertained, perhaps without even realizing it. Consequently the large-scale public support for conservation in general in the West is indebted to zoo interpretation and outreach programmes.

Keeping animals in captivity for most reasons in the past was a *luxury.* Today keeping *certain* animals in captivity is a *necessity,* not a luxury. There are a number of important species today which will *not be* with us tomorrow unless we keep them safe, either in zoos or in other *ex situ* breeding facilities. Why? Because we are losing or have lost the battle to save the natural habitat in some areas. So the job of wildlife specialists is to make zoos and other *ex situ* breeding facilities safe for the animals we are holding in trust. Some zoos are not safe for all species for a number of reasons.

Zoo Management is a Separate art and Science

"The ideal solution for a zoo is not to provide an exact imitation of the natural habitat but rather to transpose the natural conditions in wild, bearing in mind biological principles, into the artificial ones of the zoo". Heini Hedigger in *Man and Animal in the Zoo.*

Wild animals in captivity are, no matter how big or natural the enclosure, living in a highly unnatural situation for them. Therefore knowledge of behaviour of wild animals in wild conditions will not completely prepare a person for managing wild animals in captivity. Zoo and captive wild animal management is a completely separate subject from wildlife management and forestry. For that matter zoo and wild animal *medicine* is also a specialized field for which training in treatment of domestic animals does not adequately prepare one. The same thing can be said for zoology and behavioural psychology.

The point needs emphasis because it often happens that a man is deputed to the zoo with a background in wildlife, forestry, zoology or veterinary medicine. While any of those subjects are simply *excellent as background,* it is like a B.Sc. in mathematics approaching the field of nuclear physics - he is *well trained to learn a* new *field,* but he does not *know* nuclear physics. If he thinks by knowing math he knows nuclear physics, he will never *learn* nuclear physics.

Like that if our man trained in wildlife, forestry, zoology or veterinary medicine thinks by knowing those fields he automatically knows the intricacies of zoo management, he will never learn it. It is an attitude of mind-an attitude of having an *OPEN* MIND.

It must be emphasized that zoo and captive animal management is a delicate and difficult art and science. It requires patience, devotion, dedication and love of animals. *Anyone* having those qualities can become a good zoo man, no matter what his other qualifications. But in my opinion at least, no one *without* those qualities will become a good zoo-man, no matter how impressive his qualifications.

What is a Safe Zoo?

What is meant by a safe zoo, or animal facility? A safe zoo, in my opinion, is one in which *the animals within live longer and breed more effectively than they do in the wild.* An example of a truly safe facility would be the Duke University Primate Centre in

Durham, North Carolina, where their entire population (which con-sists of 700 prosimians, the most delicate and rare primate) is 85% captive-born. Some of their lemurs have bred through nine generations and lived over 30 years. The survival rate for new-born lemurs in the wild is said to be less than 50%. At this centre, the survival rate of young is over 80%; - research is of the benign type only.

This particular species of primate is *safer* in the Duke Primate Centre than it is in the wild where it is going extinct. The Duke Primate Centre is *producing* more animals than it is *consuming.* That's a safe place.

To quote another example, however, European and American Zoos have succeeded in breeding literally hundreds of the highly endangered Siberian tigers. There are more in captivity than there are in the wild. Of the 1060 and more Siberian tigers held in International Species Inventory System (ISIS) member zoos in 1984, 97% were captive born. There are, in fact, so many Siberian tigers, that some zoos, unable either to construct enclosures for them or to even give them away to other zoos, have euthanized normal, healthy Siberian tiger cubs. Now here is a case where zoos have become so safe as to be dangerous. We must make our zoos safe from overcrowding as well as from high mortality.

Let us pursue this aspect. It has been estimated that 1500-2000 terrestrial vertebrates will be facing certain extinction by the year 2015. Of these, many taxa will be mammals which will be lost to posterity without the intervention of *ex situ* preservation programmes, such as zoos or other holding facilities. Zoos, however, have a limited carrying capacity. Dr. William Conway of the New York Zoological Society has roughly calculated that the zoos of the world can hold about half a million individual animals. These figures are very rough and are based only on space available, not quality of captive habitat. To insure any degree of genetic viability several hundred of each species should be maintained. According to Conway's rough figures 2000 taxacould be maintained with a population size of 250 and only 1000 taxa could be maintained at a population size of 500. This is presuming that all goes well and no funding problems emerge. But maintaining 1000 taxa population of 500 individuals for 29 years will cost roughly 25,000,000,000 million dollars or 30,000 crores rupees). To bring this closer to home, it costs Borivilli National Park 20 lakhs a year to feed 40 lions.

Moreover the holding capacity of zoos contains a paradox: good management, or safe zoos, will eventually produce a surplus of animals. How to contain the surplus and at the same time have room for the needed variety of taxa is another manage-ment problem. Therefore if zoos are to fulfill their role as savings banks for endangered species they are going to have to become *selective* as well as safe.

The Species Survival Plan (SSP) which is a project of the American Association of Zoological Parks and Aquariums deals with precisely this problem. There are Species Survival Plans for certain endangered species. Institutions participating in these plans elect representatives who evaluate the world captive population of a species and make recommendations for breeding Programmes. The SSP Committee can also recommend that a zoo *stop* bleeding a particular animal when the optimum number for the world's captive carrying capacity and the genetic viability of that population has been reached.

In addition the Zoo Community North America has formed a set of national criteria for deciding which wild taxa should be given priority for conservation in our limited holding areas. These criteria are (1) Degree of endangerment in the wild (2) Feasibility in captivity and (3) Uniqueness in relation to other taxa.

Zoo Management: Need for Separate Space and Staff for Delicate Animals

Not all zoos in the world will be in a position to breed just any animal that takes their fancy. Many zoos will not be able to breed *any* delicate animals. For example old, small zoos which are located in the heart of a crowded city with no room to expand, no funds to improve, and no flexibility in engaging or dismissing staff should not even accept the more delicate animals unless they have a history of success with that animal. Such zoos could, perhaps, serve as holding facilities for the sturdier animals and could devote themselves singularly and enthusiastically to the important business of educating the public. Hopefully, however our inner-city zoos will be in a position one day to maintain separate breeding and research centres some distance away and all our zoos with space will maintain them on their own premises.

The crowds of visitors which flock to zoos for picnics and fun are definitely a hindrance and disturbance to the animals. One reason why the Duke Primate Centre is so successful is that it is not a *Public* facility - they do not allow casual visitors. If a hospital or research lab had thousands of misbehaving people tramping through every day there would be few lives saved or new discoveries made. Yet, zoos exist for and because of visitors - the educational potential of the zoo is tremendous and most zoos need gate receipts to help meet their expenditures. How then to satisfy visitors and simultaneously maintain a safe zoo? Again it is a management problem.

Therefore in animal management I'd highlight is *the need for separate accommodation and selected staff for breeding delicate species* of animals which so far have not done well in captivity.

Some animals breed easily, like the big cats, others do not. Even with easily bred animals, it is not a case of just putting a male and a female together and waiting for babies. Close and careful and sophisticated daily observation is needed for *sustained* success. In my opinion this kind of observation cannot be done by untrained or uncaring persons. Moreover animals do not do well in chaotic environments. They need some peace

and quiet, particularly for breeding. Loud metalic noises, such as cage doors slamming, and buckets clattering frighten many animals to the point of panic. Some never become fully accustomed to the intrusion of keepers, particularly if keepers are insensitive and even hostile as some of them are.

And finally the psychological effect of being surrounded daily by thousands of people staring, hissing, roaring, and throwing things takes its toll.

More and more zoos are establishing separate breeding centres away from cities with only a portion of the facility open to the public. More and more zoos report in their magazines that certain animals were kept "off-exhibit" for successful breeding the Golden Lion Tamarin monkey is one that comes to mind.

Rare and delicate animals with which you have had no breeding success could *be* isolated from the public and given special keepers. Surely not every zoo can afford to immediately construct a separate breeding facility. Probably every zoo, however, has some area or enclosures which could be isolated from the public. You can try this as an experiment with very good results. Madras Zoo has done it at their new Vandalur facility where they have room to do anything they want and is enjoying great success with some animals never kept for long in captivity. Their breeding cages are not exceedingly large nor are they natural but they are completely off-limits to public therefore private and quiet.

There are many Indian animals headed fast for extinction which are not being bred on a sustained basis anywhere. Zoos must concentrate on these and on *sustained* breeding.

Large animals which breed easily and are not in demand by other zoos and which cannot ever be rehabilitated to the wild should be vasectomised or separated so they cannot reproduce. It is a shame to waste limited space and funding on these when there are so many rare ones that need attention.

Large enclosures are no substitute for animal care
A mental attitude we must contend with today is the idea that keeping animals in a vast, open enclosure is *automatically* healthier or less stressful and thus requiring less care or management. Although animals are indeed healthier and happier in natural enclosures it does not follow that this comes automatically. In fact the very opposite is true and management alertness should be increased a hundredfold in a largeopen zoo.

For one thing: the area being large it is more difficult to carry out minimum basic health checks of the animals. The basic health minimum is of course your twice daily "stool and drool" check. Has the animal had a healthy bowel movement of the right consistency. And is the animal drooling or leaking anywhere-eyes, mouth, urinary or anal regions. This is relatively easy to ascertain for every animal in the old-style iron and concrete prison-model enclosure because they are so small that the animal is easily seen. In addition the floors are non-porous so that any urine or fecal matter will stay where it is until removed for examination or for disposal. It is also easier to observe whether or not and how much the animal has eaten, perhaps the most important indicator of the early diagnosis of disease.

Checking of behaviour may be easier in the larger enclosures as the animal is more likely to be active. If the enclosure is very large however, aberrent behaviour may not be noticed for some time.

The importance of checking cannot be over estimated. In the U.K. they have a formula for checking called "BEEF": Behaviour, Eating, Eyes, Faeces, and fur/feathers. I would add an extra "E" to this formula for "enclosure". Animals often make their own enclosures dangerous for themselves. Each enclosure should be checked twice a day for potential hazards created by animals, visitors, or weather.

Another difficulty posed by the open spacious enclosures is in capturing the animal if it falls ill or for routine procedures. Further, keeping a large krall hygienically clean may be easier in some ways but at the same time if a piece of extraneous matter does get into the enclosure whether thrown over a moat by a visitor or dropped by a passing crow, it is much more difficult to see and even, perhaps, to extract.

The old fashioned small cages usually consist of two dens so that the animal can be trapped in one while the keeper cleans or repairs the other. In some modern large enclosures this facility does not exist so that if a keeper enters the krall he is in some instances entering with the animals.

Pregnancy also presents problems in the large enclosures. Expectant mothers have to be watched especially carefully and denned early so that they don't give birth in the open.

None of this is meant in any way to denigrate the open enclosure. The open enclosure is the best thing that has happened to zoo animals since zoos began. It is only to emphasize the point that big natural enclosures do not guarantee a healthy animal. Only devotion, care, and concern will increase the odds of having healthy animals-devotion to detail, care in feeding and medication, and concern for the animal, both his mental as well as his physical well-being.

Taming and Training
An animal's mental well-being is sometimes overlooked. Therefore the second aspect of animal management I would like to discuss is that of training and taming animals. Speaking of taming and training animals its not meant as taming them to the point of being pet-like nor do I mean training them to do tricks. I mean by taming that the animal should not go wild with fear or rage when a keeper or staff member approaches it or enters its territory. Training means the animal should at least respond to some stimulus by entering a holding cage for purpose of feeding, transport, medication, or capture in the event of an escape. If the animal is well-trained then it doesn't have to be forced and

those ugly scenes a dozen shouting keepers in an enclosure frightening an animal into a smaller enclosure can be avoided. These scenes are not good for the animal's mental well-being or for the zoo's public image. However, if an animal is destined for rehabilitation in the wild these remarks do not apply; this is only for animals which will spend their whole lives in the zoo.

We dwell on difficulties inherent in open enclosures because many difficulties can be surmounted by taming and training the animals to accept a human presence and to obey human commands. The ungulates are in general very highly strung animals and have a bad habit of becoming hysterical when any foreign presence enters their territory. Whenever one deer has to be caught and treated there is every likelihood of losing several more in the process. The type of taming and training is *limited* taming and training, so that the animals grow up with their own kind but simultaneously become accustomed to human beings. If the animal is kept with humans too long, he will never understand what he is.

Animals in captivity anywhere often reject their offspring. There are also other reasons in zoos why babies have to be separated from their mothers. And of course the zoo usually gets the orphans which Forest Rangers find in the forest or confiscate from persons keeping them illegally. The facilities we have in most of our Indian Zoos for caring for baby animals are not up to standard and a great many baby animals are lost. These failures are ignored because baby animals are difficult to rear, which is not right. When a zoo even has a nursery, it is not continuously maintained. Sometimes there won't be any baby animals and it falls into disuse for several weeks or months until another baby comes. During that time all established routines and discipline falls apart and have to be re-established.

I would like to make some suggestions in this regard: First of all I suggest there should be a regular keeping staff for this and all hospital work. There should be a rock bottom minimum of three people who can and will work eight hour shifts round the clock, maybe unmarried or widowed keepers. This is so they know the routine and you can avoid having the person work over-time and as a result hold you to ransom as the only man who knows nursery work.

Even when there are no wild animals in your nursery the 24-hour routine should be kept going for practice rearing different types of baby animals even kittens and puppies of stray animals to be had. If your keepers never handle a baby bird until a Great Indian Bustard chick gets rejected he will make mistakes that could be avoided with this practice. Keepers who have become accustomed to the routine, discipline, and technique of feeding any baby birds will be better qualified to work with delicate ones when they come along. The same is true for other species. Because we never know when we will be forced to handrear baby Clouded Leopards, Nilgiri Langurs, Hispid hares or Wild dogs, it is worth-while to keep the keepers and ourselves in form with ordinary monkeys, kittens rabbits, puppies and chicks. For nursery care ladies in zoo management, particularly in keeping positions for small, shy, delicate and baby animals would be helpful.

Preparation and Practice

The last aspect of zoo management I would like to discuss is the need for more attention to preparation and practice for contingencies or emergencies. AAZPA prepared the *Animal Care Contingency Plan* providing an outline of instructions for what to do in case of a keeper strike, a natural disaster such as earthquake or flood, or public emergency such as animal escape or bomb threat. *Auckland Zookeeper's manual* gives a detailed list of every piece of emergency equipment and where it is kept throughout the zoo. This is an area where I feel our zoos are REALLY not OK, that is, *in practice and preparedness for emergencies.*

Zoo veterinary doctors must insist on facilities to enable them to practice tranquilization and other emergency routines and to train others in emergency routines. Every week you should tranquilize *something,* even if just a common monkey or a stray dog… for practice in dosage, in keeping the gun in working order and in developing confidence.

The last point I would like to make is about record keeping and recording your experiences. Recently I came across two very old books about animal management both written by Indians. One was written during Akbar's time by his secretary, Abdul Fazl, and contains records of how they managed several hundred elephants in Akbar's Court. It has even been recorded that the male elephant calf takes a few days longer to mature in the womb than the female.

The other book is called a *Handbook of Management of Animals in Captivity in Lower Bengal* by Ram Brahma Sanyal who was the Superintendent of Calcutta Zoo in the 19th century. This book was published in 1892. It gives a tremendous variety of information - diet, behaviour, sickness, enclosure, method of transportation, etc. for 241 species of mammals and 400 birds. R.B. Sanyal kept very good records. Now that is the last book to be written in India on Zoo Management. Nearly 100 years of zoo-keeping in India have passed utterly unrecorded. More recently written western classics such as Crandall's *Management of Wild Mammals in Captivity* quotes Sanyal a number of times. I would like to encourage all of you take responsibility for recording as much data about the animals you deal with as possible and writing about them.

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