THE CHANGING FACE OF ELEPHANT MANAGEMENT IN THE UNITED STATES

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ABSTRACT

The Zoological Society of San Diego with its two facilities, the San Diego Zoo and the San Diego Wild Animal Park, manages one of the largest collections of elephants in the United States. During the last decade, several significant perceptual changes in the United States have converged with a growing awareness of threatened and declining wild elephant populations. These changes have been important contributing factors in causing zoological institutions in the United States to begin to scrutinize every aspect of their elephant management programmes. As a result, institutions are now examining their methods as well as their purposes for managing captive elephants.

Experiments with alternatives to the traditional free contact management of elephants began at the San Diego Wild Animal Park in 1989. The experimental programme was driven by the need to gain safe access to our bull elephants and our desire to determine if there was a safer method for managing the needs of captive elephants. In 1991, encouraged by the results of the pilot programme, we launched an expanded six-month test with a bull and cow of each species. In 1992, we undertook major facility modifications designed to support the management of our Asian elephant herd using a method that has now become popularly known as "protected contact". Today, a number of zoological institutions in the United States are either actively exploring a change in the way they manage elephants, or are in the process of substituting their traditional methods for managing elephants for protected contact management.

INTRODUCTION

There are 87 zoos in the United States with elephants. Of the institutions maintaining elephants, 78 participate in the American Zoological and Aquarium

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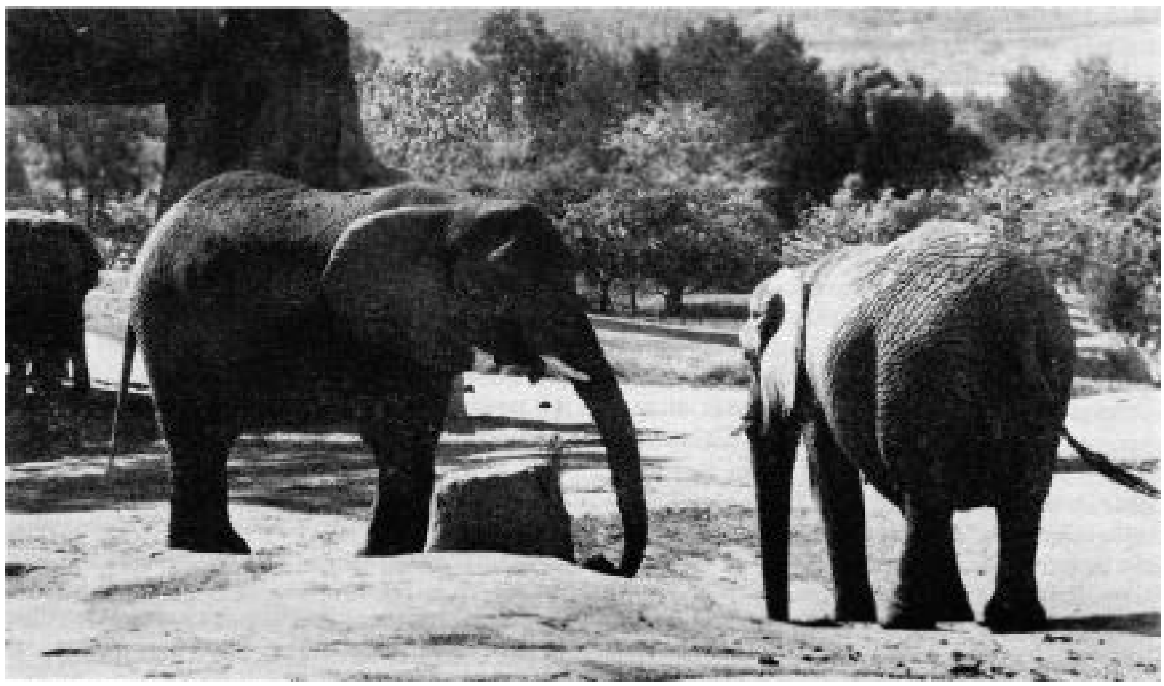

African elephants on exhibit at the San Diego Wild Animal Park

Association's Species Survival Plan for the elephants. Currently, the American Zoological and Aquarium Association (AZA) [formerly AAZPA] members maintain a total of 25 male and 134 female Asian *(Elephas maxim us)* elephants and 19 male and 129 female African *(Loxodonta africana)* elephants at their institutions (Tuttle, pers. comm., 1994). Between its two San Diego facilities, the Zoological Society of San Diego maintains one of the largest groups of elephants in the United States, housing one male and seven female Asian elephants and one male and six female African elephants.

The Zoological Society of San Diego acknowledges its responsibility to help meet the wildlife conservation challenges of the future. Conservation, education and recreation form the core values of our institution's mission statement. The primary purpose for managing our elephants in San Diego is for their exhibition and reproduction.

Some of the factors which have stimulated a new approach to elephant management include:

Increasing risks

Because captive elephants are generally less mobile than wild ones, they require daily care if they are to remain healthy. Ensuring routine access to an elephant's feet for cleaning and regular maintenance is of utmost importance. Yet, because of their sheer size and power, elephants can be lethal (Benirschke & Roocroft, 1992). During the last several years, zoo directors and collection managers have become increasingly sensitive to an impending crisis in traditional captive elephant management. Elephants are responsible for injuring more zoo keepers in the United States than any other animal. Since 1976, 17 keepers in the United States have been killed by elephants (Lehnhardt, pers. comm., 1994). Eight of these fatalities have occurred in just the past five years. Statistics indicate that the risks associated with traditional management methods seem to be increasing. Each year, with shocking regularity, reports of keeper fatalities continue to occur. No statistics are available as to the number of near misses or elephant-inflicted injuries that have been suffered by keepers. The United States Bureau of Labor Statistics and the National Safety Council list elephant keeping, just beneath coal mining, as the most dangerous occupation in America. In the United States, elephant keepers are at greater risk of being killed on the job than either police officers or fire fighters (Lehnhardt, 1991).

Animal rights

In the United States, growing awareness of the dangers of an expanding human population coupled with the knowledge of the accelerating loss of habitat and decline of wild animal populations has helped fuel the social phenomenon known as the animal rights movement. Americans generally now have a greater awareness of the fragility of the earth's ecosystems. There is also a greater appreciation for the uniqueness of each of the species. As a positive result of these sensibilities, the care and treatment of all captive animals are coming under increased scrutiny at zoological institutions, from both internal sources as well as external ones.

The traditional method for managing the behaviour of a captive elephant occasionally requires the use of physical discipline. The same can be said of dog or horse training. However, in this new environment, using any physical discipline regardless of the justification to control the behaviour of an endangered animal seems incongruous. Without respect to the potential for the loss of a keeper's life due to an intractable elephant, the public's tolerance for the physical discipline of any animal is diminishing. Against this backdrop, zoo directors and curators have found themselves squarely in the centre of an increasingly uncomfortable dilemma. "How do we continue to meet the husbandry needs of the elephants in our collections in this environment?"

Advances in behavioural science

Concurrent with the pressures of several significant social changes has been a growing acceptance of a more positive method of training animals. Operant conditioning has proven to have application with a wide variety of both marine and terrestrial animals in the zoological environment (Priest, 1990; Mellen & Ellis-Joseph, in press). Needs not met, new technologies and economic necessity are the engines that drive nearly all revolutions in human thought. All three of these components have played a part in changing elephant management in North America.

Considering the risks to keeper staff, declining wild populations, and the enormous cost of maintaining elephants, institutions around the country are now asking, "Why are we managing elephants?" Captive elephant management has come to a critical juncture in the United States.

BACKGROUND

In 1989, an independent behavioural consultant approached the Zoological Society of San Diego with an idea to apply techniques to elephant training that since the 1 960s had proven very successful with marine mammals (Pryor, 1991). The pilot project lasted 45 days and was undertaken with two animals, an African and an Asian bull elephant. Because of potential risk to keepers, these bulls had not been handled in the traditional free contact system for several years. At the end of the 45 day test period, both bulls had responded to their training well and the results were very promising (Desmond & Laule, 1991).

In January 1991, during the period between the pilot study and the next phase of our experiment, tragedy struck at the Wild Animal Park. One of our Asian elephant keepers operating in free contact was accidentally stepped on and killed by an Asian elephant cow. The death of Pam Orsi galvanized our resolve to continue our efforts to develop a safer method for managing elephants.

By April 1991, based on the success demonstrated in the pilot project, a second, more elaborate test was undertaken. The objective was to begin to refine the requirements for elephant training that exclusively used positive reinforcement. The second test involved four animals, both our bulls as well as one cow of each species. In this expanded programme, animals considered by the Wild Animal Park's elephant manager and supervisor to be "worst cases", owing either to their individual disposition or tendency toward aggression, were selected for protected contact training. At the end of a six-month trial period, managers were encouraged and began to make plans to develop a facility that would allow the application of these techniques to the management of a large group of elephants (Priest, 1 992,A). Our entire staff of elephant keepers attended staff development classes in behaviour theory and operant conditioning (Stephens, 1992). Keepers were required to take and pass written examinations covering a variety of topics including elephant training under both methods, elephant ethology and husbandry.

During the spring and summer of 1992, the Zoological Society invested nearly US$500,000 towards developing facilities that would support the protected contact management of the herd. With facility modifications and keeper training complete, in October 1992, we began to manage a large group of Asian elephants exclusively by protected contact. In addition to all the behaviours required for their care, the elephants learned to hold their position while other elephants in the group were given the opportunity for training sessions. In April 1993, in our newly re-designed elephant show arena, we began offering the general public a demonstration, twice daily, of the new techniques for elephant training, care, and management. We have yet to cancel a demonstration because of a refusal by the elephants to participate. We are currently in the final stages of a year-long programme evaluation that will conclude in June 1994. The evaluation of the programme will cover a review of our consistent ability to gain access to the animals, their behaviour, health, and the keepers' ability to use their new skills in order to maintain the behaviours exclusively through protected contact.

METHODS AND RESULTS

In the traditional free contact method, the keeper enters both the animal's exhibit space and the social structure and moves freely among the elephants to accomplish his/her objectives. Through the delivery of positive (social, tactile, and food rewards) and sometimes negative reinforcement (through the bull hook or ankus), the keeper uses his/her skill to become accepted by the elephant as the dominant member of the elephant's social hierarchy. Free contact is relationship-dependent with each individual elephant.

At the Wild Animal Park in San Diego, the parameters for our own free contact training programme seemed nebulous or subjective; there seemed to be a general absence of accepted reference points from which to work. This is perhaps because much of the information about traditional elephant management has been handed down orally from one generation of keepers to the next. There is little scientific information regarding techniques in traditional elephant management available in the literature. The free contact method lacks a coherent system that can be accurately and objectively transferred from one keeper to the next in a reasonable amount of time.

The term "protected contact" was coined to describe an alternative system to traditional elephant management. It is a "hands-on" system designed to maintain physical contact with captive elephants while maximizing keeper safety, whereby keepers do not enter into the enclosure with the animal. Instead, they use food treats to form a co-operative relationship

Photo credit: Ron Garrison

Assistant behaviourist, Jennine Antrim, applies medication to Chico's eye. Chico is a bull African elephant. By training animals to accept voluntarily such husbandry procedures, the risks associated with veterinary intervention through chemical restraint can be avoided. As an added bonus, procedures like this are far less stressful to the animal.

with ,the elephant and work with the animal from a shielded position outside the enclosure. Because the keepers in protected contact remain outside the elephant's enclosure, no physical discipline is required to ensure the keeper's safety or maintain behavioural control. The premise is that keepers working from positions behind protective barriers can selectively reinforce, shape and maintain all the behaviours required for proper elephant husbandry.

Unlike free contact where a keeper's life depends on the elephant's compliance, the elephant in protected contact is a voluntary participant. Keepers rely exclusively on the power of a timed or selective delivery of positive reinforcements to accomplish their objectives. The method completely changes the dominant/subordinate relationship between elephant and keeper, which is especially important with musth bulls.

The elements of protected contact management include a combination of the following: facility design, animal and keeper position relative to protective barriers, and operant conditioning techniques designed to encourage the animal to comply voluntarily with the keeper's objectives. In the protected contact system, behaviour modification is accomplished exclusively through the use of positive rewards including a wide variety of food treats, tactile and social reinforcers. No physical discipline or food deprivation is ever used with our elephants. The elephants receive their normal diet of sudan or oat hay and alfalfa.

Reinforcement is delivered when the animal performs correctly in response to a specific signal. If the animal performs a behaviour incorrectly or in a manner below standards, it is simply given another opportunity to earn the reinforcement. The elephant's behaviour is modified exclusively through the skilled use of operant conditioning, which is a *systematic* conditioning process used to modify or shape an animal's behaviour towards a desired goal. In essence, operant conditioning is a universal language that an animal can understand and use to its benefit. The consistent and skillful use of this language provides information to the animal about its environment and how to go about gaining something it desires. These behaviour modification techniques fall under the well-established principles of behavioural theory (Holland & Skinner, 1961; Mazur, 1990).

Through conditioning, our elephants quickly learned to pair the sound of a dog whistle with the delivery of a food reward. The whistle in effect serves as an I.O.U. to the elephant. The whistle provides important information that helps the animal pair its actions with a positive consequence. It also bridges the gap in time

Photo credit: Ron Garrison

These two photographs show how Chico, a bull African elephant, is trained to stand parallel to the steel barrier and extend his ear through a specially designed port. This behaviour is completely voluntary on the elephant's part. Chico can choose to leave at any time. Chico will obediently hold position until the blood collection procedure is complete. Experience has shown that our ability to gain access to this animal is nearly 100%, dipping in reliability only slightly during his musth period.

between when the animal performs a behaviour and the delivery of a reward. Rewards can take a variety of forms as long as they are something that the animal desires. For training reinforcements, we use food treats consisting of monkey chow, cut carrots, apples, sweet potatoes, corn on the cob and seasonal fruits.

The technique used for moving elephants from one place to another was borrowed from marine mammal trainers. After whistle conditioning, the first behaviour the elephant is trained to perform in protected contact is to touch the bridge of the trunk to a foam target. Once the elephant has learned this behaviour, we use the targets to move elephants into a desired position and then from one place to another. The photographs illustrate a variety of the techniques being employed.

FUTURE PLANNING

With the expected completion of our first (of three) hydraulic elephant restraint chutes in June of 1994, San Diego's elephant management plan will employ a three-branched strategy to provide complete health care for our elephants. The three methods in order of priority are: (1) routine access through behaviour modification and protected contact; (2) occasional access by means of the restraint chute; and (3) in rare cases veterinary intervention through chemical restraint.

Similar to the process required to train an elephant for voluntary blood collection, every elephant exposed to the possible stresses that may come to be associated with confinement in a restraint chute will first be systematically desensitized to them. Stress reduction is an important part of good animal husbandry. Elephants will also be conditioned to perform all normal husbandry behaviour, (which are listed in the Appendix), within the confines of the restraint chute. In this way, the elephants will react positively to the restraint chute.

DISCUSSION

To a large degree, our training in protected contact has relied on conditioning already done in free contact. In San Diego, we have been fortunate to have many well trained and tractable cows with which to work. As we introduced protected contact to them, in many cases it was simply a matter of changing the context and orientation of the training tools we used in order for the animal to understand, generalize, and comply with our wishes. The cows did take a while to learn that the target and bull hook were used very differently. With the bull hook, the cows had been conditioned to move away from the stimulus, conversely, when the target was presented, the cows were required to approach and touch it in exchange for a reward. Naturally, the cows were wary at first,

Photo credit: Ron Garrison

Keeper Steve Cunningham uses a farrier's hook-knife and a wood rasp to trim the pads of an African bull elephant's feet. Using this method, the keeper is better shielded from physical injury, and the elephant is a voluntary participant, working in exchange for food treats consisting of apples, corn, carrots or yams.

but in every case, this shift was accomplished with a few hours of training, spaced over a three-week period (Priest, 1992,B).

Extensive free contact conditioning was not present in either of our bulls. Neither animal had been worked in free contact for several years, yet each has been able to learn and perform the same husbandry behaviours as the cows.

However, all captive elephants had been exposed to at least some degree of traditional training. Though it has yet to be demonstrated with a completely naive elephant (juvenile or wild-caught), I am convinced that behaviour modification relying exclusively on operant conditioning and positive reinforcement might take longer than was our experience but would prove to be just as successful.

Challenging the status quo or any traditionally accepted practice is seldom easy. Such has certainly been the case with elephant management (Desmond & Laule, 1993). Many professional elephant keepers' convictions are strongly held and are not easily changed. The development of protected contact has not been without opposition (Zoll, 1992). However, concern for keeper safety and the need to maintain healthy elephants now override opposition to change on a national scale. The AZA position statement reflects the trend in elephant management. "The Board of Directors of the American Zoological and Aquarium Association philosophically believes the future management of captive elephants should be based on methods associated with protected contact..." (Wylie, 1993).

In my judgement, only those institutions with the resources and commitment to pursue the following three criteria should consider elephants as an appropriate species for their collection. These criteria are:

1. to create the safest possible working environment for their keeper staff,
2. to maintain a programme that meets the husbandry requirements of the elephants and
3. to participate fully in the American Zoological and Aquarium Association's Species Survival Plan for captive elephants (Priest, 1994).

CONCLUSION

In conclusion, the following are some of the more important benefits that we have come to associate with protected contact elephant management:

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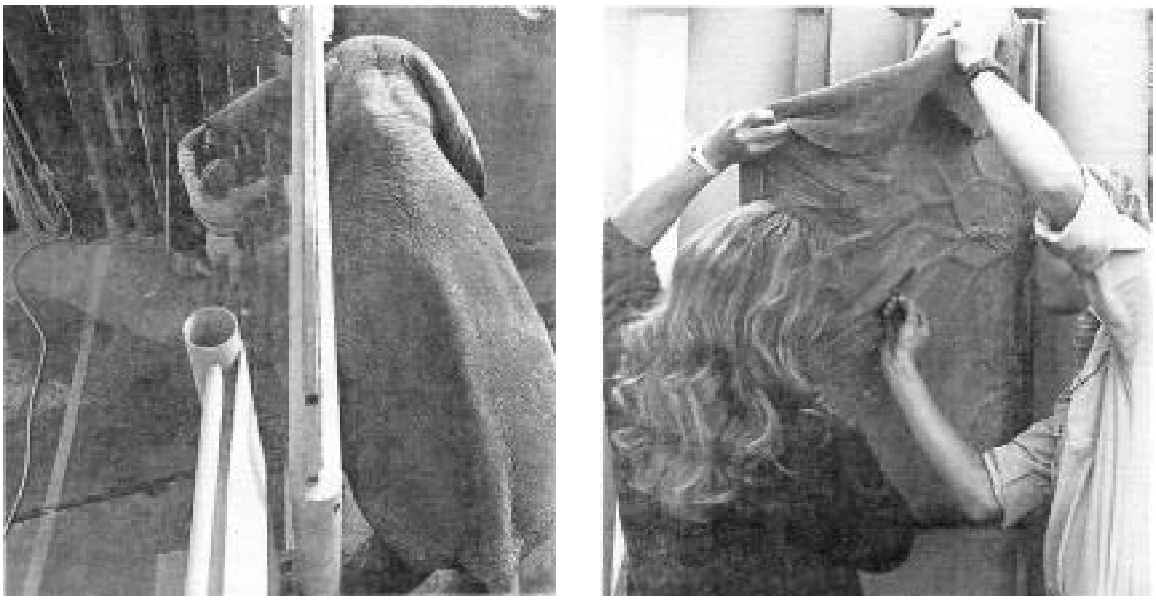

In this photograph, Chico, a bull African elephant, is encouraged to touch his toot to a foam target. In this case, the keeper is gaining access to the animal's rear feet for examination and foot pad trims. The animal is trained to hold this position (up to 10 minutes) until given a separate command to step down. Preventing infections and treating foot problems is critically important in maintaining healthy captive elephants.

Safety

Through voluntary co-operation on the part of the elephant as well as trainer and animal position relative to protective barriers, protected contact can reduce the potential for animal-related keeper injuries.

Employee turnover

Protected contact can establish a safer training environment for new or inexperienced keepers, when operating under experienced supervision.

Consistent application of technique

The AZA Elephant Species Survival Plan Group states: "Most cases of elephants becoming unmanageable can be traced back to inconsistencies in handling." Operant conditioning establishes a clear formula and a common basis for consistency and uniformity within the elephant keeper staff. It establishes a common language, understood by both animal and keeper, and provides a medium of exchange or currency between the two. The system will, in short, allow a new keeper to become as reinforcing as a keeper with which the animals are familiar.

Animal rights

Operant conditioning is a method which is sensitive to animal rights and public relations. It projects a more consistently positive image to the public. The system provides elephants with positive rewards for voluntary co-operation. It eliminates the physical or psychological trauma incidental to the physical discipline necessary to establish and maintain the social dominance sometimes required to control the behaviour of elephants in free contact.

Without compromising elephant husbandry, protected contact is proving to be a logical, well-planned response to an ongoing animal management problem. The future of the use of traditional methods for training elephants in zoos may now be in doubt. However, for some time to come, there may continue to be a demand for skilled keepers capable of working in free contact, with elephants. Such specialists may become rare.

In San Diego, we are becoming more confident in our ability to manage the needs of our elephants safely. Now, our fondest dream is to, encourage our elephants to begin producing calves. As an institution, we recognize that the education of the public and contributions to captive reproduction are, by

Photo credit: Ron Garrison

Ranchipur, our bull Asian elephant, is given a reward by assistant behaviourist, Jennine Antrim, while a keeper inspects the animal's feet and nails.

themselves, an insufficient effort on behalf of elephant conservation. Besides these commitments, we also have a keen interest in exploring ways we can help to preserve large tracts of elephant habitat. Thus, we are working to provide a more secure future for elephants in our rapidly changing world.

Appendix:

Husbandry behaviours required for protected contact elephant management

1. Whistle conditioned
2 Target conditioned (animal's head)
3. Target conditioned (second target)
4. Left front foot up on command
5. Right front foot up on command
6. Left rear foot up on command
7. Right rear foot up on command
8. Left front foot trim (animal holds position for minimum of three minutes)
9. Right front foot trim (animal holds position for minimum of three minutes)
10. Left rear foot trim (animal holds position for minimum of three minutes)
11. Right rear foot trim (animal holds position for minimum of three minutes)
12. Lean-in right side on command
13. Lean-in left side on command
14. Trunk up on command
15. Trunk down on command
16. Retrieve object

17. Trunk up and mouth wide open for oral exam
18. Present right ear for inspection and/or blood collection
19. Present left ear for inspection and/or blood collection
20. Allow blood collection from either ear
21. Present for and allow anal palpation
22. Back-up on command
23. Steady (remain stationary) *on* command
24. Come towards the trainer on command
25. Enter and leave the introduction or restraint chute on command
26. Place feet in a tub of water (animal holds station for a minimum of three minutes)
27. Moving from position A to B through gates on command
28. Right eye examination on command
29. Left eye examination on command
30. Station for entire body scrubbing
31. Stationing while another animal moves through a gate on command
32. Allow vaginal manipulation

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