

# Why are We Here and Where are We Going?

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This series discusses wild mammals in managed settings, focusing on such diverse topics as activity cycles, nest boxes, data management and diet. However, to help put this information into perspective, it may be appropriate to speculate upon a biological basis for the existence of zoos and to consider what major trends will affect them in coming decades.

As hunter-gatherers for millions of years, humans survived (or didn't) largely because of their ability to identify, acquire and use beneficial plants and animals while avoiding dangerous species. Those early ancestors with a particularly keen interest in the natural environment, including perhaps a fascination with animals and plants, may have experienced a somewhat enhanced survival rate. As a result, these characteristics became widely distributed and, one may speculate, are still well represented in the current human population. Hunting is after all a major form of recreation in modern western society. And Americans keep 60 million domesticated cats and 54 million dogs as household pets (A.P.P.M.A. 1990). If a genetically based fascination for plants and animals was discovered, it would also largely explain the existence and popularity of zoos, aquariums and game parks. (It could even help to explain our need to landscape, send flowers and keep potted plants in our homes).

If zoos prosper because they fulfill an inherent need in much of the population to see and enjoy wild animals, what would be more appropriate than to use that need, that latent curiosity, to help perpetrate the few remaining representative wild areas and species of the original world?

## Zoo Trends and Opportunities

Zoos and other wildlife facilities, like all cultural organisms, must adapt to changing environments or perish. Awareness of present and anticipation of future trends can help to guide this adaptation.

The following summary of major trends is not all-inclusive and, as will be seen, considerable overlap exists among the topics. The discussion is based on the personal observation of an experienced generalist; it is designed to stimulate awareness, discussion, research and informed choice.

### **Trend One: Changing Attitudes toward Wildlife**

In the section on *Exhibitry*, previous eras in zoo development are discussed as they relate to popular wildlife values of their times. Seidensticker and Doherty (this volume) present four current

animal management models: the traditional "zoo" model, the "ethological" model, the "medical" model and the "humane" model. Seidensticker cites Kellert's 1989 finding that a majority of zoo enthusiasts may support this "humane" model. A majority of zoo professionals probably support one or more of the other models.

Recent events show that animal welfare activists are increasingly able to sway public opinion and influence legislation affecting the way animals are managed. Inflexible, unresponsive resistance from either the "medical" or traditional "zoo" point of view could galvanize and strengthen those espousing the "humane" perspective.

However, it is important to realize and make the public aware that these models need not be mutually exclusive. On the contrary, they could be fused into a broader biocentric vision. The humane perspective, when balanced with an understanding of ecological and ethological principles, can lead to increasingly respectful animal management and display concepts. The gorilla facilities at Woodland Park Zoo, Zoo Atlanta (Coe & Maple 1987) and the Dallas Zoo (R. Kagen, personal communication), to name several examples, were based on the concept of portraying the gorillas as autonomous species, capable of living self-sufficient lives if protected from human interference. This presentation not only engenders respect (Coe, 1985), which should be a cornerstone of humane conviction, but demonstrates the correlation between habitat and species protection.

This biocentric perspective also may provide insights into the design of animal off-exhibit and research facilities. Dallas Zoo provides removable natural substrate and tropical plantings inside their gorilla holding building to create a more species-sympathetic environment.

Another example of respect for the animals is the increasing interest in providing confined species the widest possible range of choice in their daily lives (Lindburg & Coe 1995). Snowdon (1989, 156) suggested that providing primates with environmental control (or work) can reduce stress and aggression and increase coping and social skills. Following this line of thinking, why not give animals' control, within practical ranges, over light, temperature, humidity and other ambient parameters in their enclosures?

The concepts of "choice" and "freedom" are closely related. While it is true that many zoo critics with humane concerns are unaware of what "wild and free" mean from an ethological or ecological perspective (Hediger 1950, 9 & 12), it is also true that most captive species have far fewer choices than they could have. A perspective based on an integrated awareness of "humane," "medical" and "ethological" viewpoints could no doubt devise numerous ways to involve the animals in the continuing search for a higher quality of life. And indeed many workers in the field are doing just that.

### **Trend Two: Continuing Emphasis on Long-Term Propagation and Management of Endangered Species:**

Long-term management and propagation requires not only technical expertise and specialized equipment, but also far greater off-exhibit space for animals not needed for display, e.g., additional breeding groups, surplus males and superannuated individuals. Since optimizing a limited gene pool often requires periodic movement of breeding stock from place to place, increased quarantine and loading facilities are required. The trend to develop remote or satellite conservation/breeding facilities may accelerate.

Experience has shown that public relations and marketing strategies must anticipate the relocation of popular animals.

### **Trend Three: Increased Regulation of Animal Management**

Growing concern for animal welfare (trend one) and endangered species protection, exacerbated by the accelerating loss of natural habitats continues to result in increasing regulation of the capture, transportation, management, display and disposal of animals. While detailed discussion of these issues appears elsewhere in this volume, the trend itself is important since it will continue to divert time and effort from other essential services.

Detailed federal regulations presently address the welfare and management of primates and marine mammals. What species are next? The Elephant Species Survival Plan (SSP) group has introduced a set of minimum elephant care guidelines intended to standardize and improve elephant care while providing greater keeper safety (Tuttle 1991). These self-policing standards attempt to obviate the need for external restrictions. Nevertheless, the Humane Society of the United States (HSUS) has called for far more restrictive standards (HSUS 1991), including the elimination of chaining and negative reinforcement in training. How are these two conflicting approaches to elephant management to be mediated? Newly applied forms of training (see Trend Nine) show promise in demonstrating a workable middle ground.

Based on the strong recent trend to regulate improvement of facilities and management for non-human primates, marine mammals and elephants, it is likely that we will soon see regulations extended to include ursids, felids and many other animal groups.

### **Trend Four: Increased Collection Specialization**

The era of the great collections is passing. The trend of having many species displayed in small enclosures is giving way to new natural habitat exhibits with fewer species and more individuals of each species (when appropriate) in far larger enclosures. Zoos are tending to specialize in species which thrive in local climates or with which they have special expertise. This trend forces the zoo manager to face difficult decisions, for example, the discontinuance of popular displays such as elephants when it is no longer possible to afford development of exhibits that conform to current size and quality standards.

Management of surplus males will become increasingly problematic, especially with large species such as the elephant, giraffe and great ape. Increasing development of game ranches in warmer climates modeled on African safari parks may absorb some of this breeding surplus. (Present American Association of Zoological Parks and Aquariums (AAZPA) standards for de-acquisition of collections do not permit hunting by those receiving stock from member institutions).

### **Trend Five: Education**

Conservation education is becoming a significant activity of zoos. While zoos are continuing to augment public school curricula with classrooms of their own, there is an increasing trend to establish a more active learning environment. As zoo exhibits become more naturalistic and ecologically based, they are becoming "field laboratories" and "habitat theaters" with hands-on activities to involve students and other visitors. However, much more can be achieved to engage zoo visitors directly in conservation activities rather than simply teaching about conservation needs. The development of the "conservation parking meter," where visitors deposit quarters to buy rainforest through the Nature Conservancy, is an example of such an effort (Gershenz 1991).

## **Trend Six: Behavioral Enrichment**

In 1990, the United States Department of Agriculture (USDA) updated its Animal Welfare Act for non-human primates. The regulations not only address minimum standards for hygiene, micro-climate and holding area size but also establish the need to provide for the psychological well being of animals. While Markowitz (1982) and others had been attempting to provide an "occupation" for several zoo species with mechanical devices and training, Hancocks (1980) and Hutchins et. al. (1984) argued for using complex naturalistic habitats. These separate approaches, well reviewed by Forthman-Quick (1984), continue today. Furnishings and objects of metal, plastic and rope are found in areas where hygiene is a paramount concern (usually off-exhibit or research areas) and natural materials such as logs, boulders, browse and vines are used where a "natural look" and aesthetic is preferred. However, these distinctions are becoming blurred and this trend should continue. For example, chimpanzees at a research center have access to large dead trees (Maki and Bloomstrandt 1988), and highly realistic artificial trees and vines made of epoxy and steel are found in many zoo displays.

The trend toward creating more behaviorally enriched habitats has fortunately led beyond the provision of gadgets and objects. Carlstead et. al. (1991) compares the behavioral advantages of hiding food throughout the habitat with fixed food dispensers. O'Neill (1989) suggests the benefits of providing large view windows for animals requiring close confinement.

The concern for creating behaviorally richer environments and appropriate substitute "occupations" for managed animals has rapidly expanded to include marine mammals, elephants, bears, big cats, small carnivores and others. This concern is closely related to the first trend discussed, the growth of an animal welfare ethic both inside and outside animal facilities. Many other trends, such as improving technology and innovative training, offer useful opportunities for behavioral enrichment.

## **Trend Seven: Continued Development of "Natural Habitat" Areas for Animals**

While the idea of maintaining exotic animal species in simulated or naturalistic habitats was introduced as early as 1896 by R. L. Garner, it has been developed most fully in the last two decades (Coe 1982, 1989, de Waal 1982). Judging from the number of major zoo projects of this type presently under design across the nation, it is a trend likely to continue for some time. We are in an era of increased environmental consciousness and eco-tourism. Zoos are responding by simulating endangered natural areas to display endangered species in appropriate special groups. The Zoo Atlanta gorilla habitats are even arranged to encourage and display appropriate inter-group behavior (Coe and Maple 1987).

While major improvements in exhibit technology and philosophy (artificial trees and rocks, zoo horticulture, landscape immersion) occurred during the last two decades, the viewer experience tended to be largely passive. "Cultural Resonance" (Jones 1989), the realistic re-creation of appropriate human cultural artifacts, while common in museum and theme parks, is becoming widely used in zoos. These areas, together with the simulated landscape, are activated by spontaneous-appearing events like "habitat theater" and "pretend family foot safaris" to more fully involve visitors in the total experience.

## **Trend Eight: Improving Technology**

The technology of the Industrial Revolution fostered colonization, which, in turn, contributed to the rapid growth of zoos in the 19th century. Advances in veterinary care and hygiene greatly extended the lives of zoo animals earlier this century while the exhibit technology pioneered by Hagenbeck

(1909), Eggenschewiller and others revolutionized animal displays. Modern biomedical technology and computer-aided genetic analysis guides efforts in managed propagation. Relatively low cost electronic apparatus coordinate building environmental systems and delight children with new ways of learning. These ever-improving devices also provide opportunities for animal enrichment that are far more flexible and random than anything available to Markowitz (1982). Ethologists, trainers and electronic inventors are presently devising ways in which cetaceans can communicate directly with the public, call up their trainers and change the acoustics of their enclosures. In terrestrial displays, modern electronics are re-creating the sounds of the tropical forest or the tundra with astounding realism and diversity. The thoughtful integration of this technology in the service of wildlife conservation education, propagation and behavioral enrichment holds great promise for those prepared to develop it.

### **Trend Nine: Training as an Aid to Display and Management**

Zoo animal acts are becoming passé, largely because of their anthropomorphic presentations and use of negative reinforcement to help shape behaviors. However, simple forms of training (often unconsciously performed by keepers) have always been important to animal management. Training technology has advanced greatly in other fields. Operant conditioning, as described by Pryor (1984), is naturally at work in human interactions and can, when properly applied, be very useful in shaping and maintaining a complex series of animal behaviors without use of negative reinforcement. Laule and Desmond (1987, 1990) have shown these training techniques to be effective in overcoming aberrant and asocial behavior in drills, preparing gorillas for introduction to unfamiliar habitats and conspecifics, and training a variety of primate and great ape species to cooperate with medical and artificial insemination procedures. All of this work was done without entering the animals' enclosures.

More recently, Desmond and Laule have supervised training of two male elephants, long considered too dangerous to approach, to have their feet trimmed and blood samples drawn. This training was done entirely from outside the enclosure with no danger to trainers, keepers or elephants.

### **Trend Ten: Increasing Construction Cost and the Sweepstakes Mentality**

While many applaud the beauty and realism of the better new exhibits or the larger, more complex, creature-friendly holding and support areas, few anticipate the increasing cost of state-of-the-art facilities. One frequently hears the complaint that funds spent for a major new exhibit complex could have bought an entire national park in an equatorial country. Yet, those in our society who are most able to support or underwrite the construction of major facilities, be they zoos or hospital wings, are unlikely to be satisfied with designs considered second best.

This trend has many implications. For more prosperous institutions the implication is that when five new facilities are needed, only four may be achievable. For less well supported institutions which cannot afford state-of-the-art, will it mean they will lose popularity and support to the bigger and "better" zoos? We have no answer. In fact, it is incomprehensible that an industry which spends so much on capital development should know so little about visitor preference and exhibit effectiveness!

A few decades ago zoos competed on the basis of collection size, diversity and uniqueness. Then came competition based on quantity (and occasionally quality) of artificial rockwork. Today, we are in an era where the "sweepstakes winner" is apt to be the builder of the largest, most complex, indoor tropical forest display. Here relatively few species are displayed at great overall cost. How are zoo policy makers to respond to this and other trends?

The discussion of *Exhibitry* in this volume emphasizes the importance of clearly establishing institutional and project goals, determining the predominant exhibit "message" and then choosing from among the available exhibit styles and management options in order to find the best fit for each facility, rather than being at the mercy of style or competition for prestige.

### **Trend Eleven: Zoo Marketing**

As zoos and related organizations attempt to become more financially self-sufficient in the face of rising construction and management costs, they must turn increasingly to attracting and holding more visitors and generating more revenue from them. Many of these marketing approaches directly affect animal management. For example, giant pandas, white tigers, golden monkeys, koalas and warthogs have been used as "celebrity animals" moving from zoo to zoo to increase attendance. Elaborate protocols guided the development and management of some but not all of these species.

As this trend continues, zoos will increasingly have to defend the philosophic basis and actual effectiveness of these exhibitions from both an animal welfare and an educational perspective.

### **Trend Twelve: Integration in the Age of Specialization**

This volume is a compendium of experience, opinion and expertise from among the most specialized and knowledgeable zoological experts. The range of subjects is broad and is highly technical. At first glance the articles may seem to have little in common. Yet the very fact that this diversity and complexity of information is contained between two covers provides the opportunity for an integrated multidisciplinary approach to solving animal management problems. In addition, several of the authors, including Robinson and Seidensticker, specifically identify the need for such collaboration.

In 1966, Lee Crandall published in one volume much of the existent knowledge needed to manage zoo animals. Today, the subject requires the collaboration of many authors in several volumes. It is an age of specialization. Yet our ability to meet present and future challenges is based on more than the sum of our knowledge. Complex multifunction institutions like zoos and related facilities need integrated management strategies with insights from diverse perspectives, including some we may not yet value.

Of all the trends discussed, none holds more promise for growth and substantive improvement in the long-term management, propagation and display of endangered species, and the increased quality and value of the visitor experience, than the trend toward greater interdisciplinary interaction and integration of technologies.

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