

Animal Welfare

Terry L. Maple  
Bonnie M. Perdue

# Zoo Animal Welfare

 Springer

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## **Series Editor**

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# Foreword

Throughout the Western world a debate is taking place on the morality of confinement. On one side are the preservationists and reformers who see existing conditions of human confinement in institutions such as mental hospitals, orphanages, and prisons as satisfactory (preservationists) or in need of improvement (reformers) and on the other side are the abolitionists who view confinement itself as immoral and unethical. These divergent views inform current discussion regarding the purposes and the morality of the modern zoo. Improving zoo conditions and enhancing their educational value, two important goals of reformers, will not mute the objections of those who see animal confinement itself as unethical and immoral. This is why discussion of zoo animal welfare is so important. The book uses welfare in its original *positive* sense, from the Middle English “a well-faring” or wish for someone to have a good journey, avoiding the current negative image that has motivated so many welfare departments to change their names to social services departments.

The book begins with the senior author’s insider account of the turnaround and revitalization of Zoo Atlanta through evidence-based reform. The next chapter lists the challenges in defining and measuring animal welfare. Because conditions found in nature are not necessarily suitable for captive animals, the book recommends the use of multiple measures with continuing assessment of outcomes. Animal preference can be one criterion but there are times when it is an unreliable guide to animal welfare.

Chapter 3 discusses research design, especially the use of operant conditioning and physiological measures in zoo research. Data collection and analysis must be suited to zoo realities, which often means small samples of selected populations monitored by volunteer student assistants. Chapter 4 introduces the concept of wellness, which takes the discussion beyond well-being into the domain of positive psychology. It was nice to see this orientation complementing Skinner’s behavioristic psychology. Chapter 5 describes the value of academic training in animal behavior and the need for research partnerships between zoos and universities which will bring faculty and students into zoos and field stations.

Chapter 6 (Environmental Enrichment) describes methods for adding sensory stimulation and providing choice and challenge. Because these enrichment efforts are not always successful, there will be a need for species-specific assessment.

Chapter 7 discusses behavioral analysis and training using the technology derived from Skinner's operant conditioning and schedules of reinforcement. The authors suggest recruiting behavior therapists using this approach successfully with humans to advise zookeepers, zoo biologists, and zoo veterinarians.

Chapter 8 summarizes the latest developments in zoo design and shows how field observations can be combined with critical evaluation of zoo practice. The authors are familiar with recent developments in zoo design both nationally and internationally. Optimal zoo size is covered as is the debate between advocates of comprehensive collections and those emphasizing particular regions or species. The section on "Encouraging constructive criticism," develops a major theme of the book, the value of bringing together zoo designers and practitioners with their critics in workshops and symposia. Two people whose views are discussed in detail are David Hancocks, former zoo director and now strident critic of many zoo practices, and Jon Coe, the innovative and futurist zoo designer.

Chapter 9 (Launching Ethical Arks) pulls it all together. Maple and Perdue believe that providing optimal animal welfare will "pay off" in terms of visitor numbers, satisfaction, and support. Active, fit, and healthy animals attract the public and give them greater satisfaction. The authors describe Dr. Maple's leadership experience in developing partnerships between zoos, animal welfare organizations, and universities. This chapter considers several relevant antinomies (conflicts between valid approaches) using the example of debates over conservation practices with endangered species. Both sides have valid positions and only research and discussion can produce workable solutions. The empirical zoo can be the staging ground for innovation and change. The book ends discussing the Comparative Quality of Life, a holistic approach that accounts for the unique perspectives, preferences, and needs of individuals.

Good sailing Ethical Ark. May debate and fruitful outcomes set your course.

Robert Sommer  
Professor Emeritus  
University of California at Davis

# Animal Welfare Series Preface

Animal welfare is attracting increasing interest worldwide, especially in developed countries where the knowledge and resources are available to, at least potentially provide better management systems for farm animals, as well as companion, zoo and laboratory animals. The key requirements for adequate food, water, a suitable environment, companionship and health are important for animals kept for all of these purposes.

There has been increased attention given to animal welfare in the West in recent years. This derives largely from the fact that the relentless pursuit of financial reward and efficiency, to satisfy market demands, has led to the development of intensive animal management systems that challenge the conscience of many consumers in this part of the world, particularly in the farm and laboratory animal sectors. Livestock are the world's biggest land users (FAO 2002) and the farmed animal population is increasing rapidly to meet the needs of an expanding human population. This results in a tendency to allocate fewer resources to each animal and to value individual animals less, for example in the case of farmed poultry where flocks of over 20,000 birds are not uncommon. In these circumstances, the importance of each individual's welfare is diminished.

In developing countries, human survival is still a daily uncertainty, so that provision for animal welfare has to be balanced against human welfare. Animal welfare is usually a priority only if it supports the output of the animal, be it food, work, clothing, sport or companionship. However, in many situations the welfare of animals is synonymous with the welfare of the humans that look after them, because happy, healthy animals will be able to assist humans best in their struggle for survival. In principle the welfare needs of both humans and animals can be provided for, in both developing and developed countries, if resources are properly husbanded. In reality, the inequitable division of the world's riches creates physical and psychological poverty for humans and animals alike in many parts of the world.

Increased attention to welfare issues is just as evident for zoo, companion, laboratory, sport and wild animals. Of growing importance is the ethical management of breeding programs, since genetic manipulation is now technically advanced, but there is less public tolerance of the breeding of extreme animals if



it comes at the expense of animal welfare. The quest for producing novel genotypes has fascinated breeders for centuries. Dog and cat breeders have produced a variety of deformities that have adverse effects on their welfare, but nowadays the breeders are just as active in the laboratory, where the mouse is genetically manipulated with equally profound effects.

The intimate connection between animals and humans that was once so essential for good animal welfare is rare nowadays, having been superseded by technologically efficient production systems where animals on farms and in laboratories are tended by increasingly few humans in the drive to enhance labour efficiency. With today's busy lifestyles, companion animals too may suffer from reduced contact with humans, although their value in providing companionship, particularly for certain groups such as the elderly, is beginning to be recognized. Consumers also rarely have any contact with the animals that are kept for their benefit.

In this estranged, efficient world, people struggle to find the moral imperatives to determine the level of welfare that they should afford to animals within their charge. A few people, and in particular many companion animal owners, strive for what they believe to be the highest levels of welfare provision, while others, deliberately or through ignorance, keep animals in impoverished conditions in which their health and well-being can be extremely poor. Today's multiple moral codes for animal care and use are derived from a broad range of cultural influences, including media reports of animal abuse, guidelines on ethical consumption and campaigning and lobbying groups.

This series has been designed to contribute towards a culture of respect for animals and their welfare by producing learned treatises about the provision for the welfare of the animal species that are managed and cared for by humans. The early species-focused books were not detailed management blue-prints; rather they described and considered the major welfare concerns, often with reference to the behavior of the wild progenitors of the managed animals. Welfare was specifically focused on animals' needs, concentrating on nutrition, behavior, reproduction and the physical and social environment. Economic effects of animal welfare provision were also considered where relevant, as were key areas where further research is required.

In this volume the series again departs from the species focus to address animals in zoos. Few areas of animal management have attracted more controversy over the last 50 years, with zoo animals' welfare, conservation value, ability to entertain and role in educating the public being evaluated in a prolonged debate as to whether it is ethical to keep animals in zoos. People's position in this debate depends usually on the relative value that they place on these possible roles that zoo animals can play. Professor Terry Maple has had a lifetime's experience with zoos and is a major campaigner and educator for improved animal welfare in zoos. As Director of Zoo Atlanta and a former wildlife psychologist, Dr. Maple has reshaped many American zoos into models for zoos around the world, using his belief in naturalistic design and a strong sense of purpose for the modern zoo. That sense of purpose comes across strongly in this inspirational volume, *Zoo Animal Welfare*.

In it Maple and Perdue raise the intriguing possibility of zoos having a major role as conservators of fauna and flora of the local area in which they are located. For the sceptics I'd say "read it, and then tell me you are still sceptical about zoos", for the believers in zoos having a purpose in the modern world, I'd say, "be prepared to be inspired by this book".

Food and Agriculture Organization (2002). [http://www.fao.org/ag/aga/index\\_en.htm](http://www.fao.org/ag/aga/index_en.htm).

St. Lucia, QLD  
Australia

Clive Phillips



# Preface

In graduate school at the University of California at Davis, I had the good fortune to work in a research lab in developmental psychobiology investigating the consequences of social deprivation. I learned quickly that disruptions in primate affectional systems, especially the mother-infant bond, inevitably induced psychopathology. As my interest in zoos developed, I was surprised to discover an entire generation of monkeys and apes exhibiting the familiar signs and symptoms of social isolation. Normally socialized primates and other social mammals are nurtured by attentive mothers (and sometimes fathers) providing the stimulation necessary for species-appropriate social and cognitive development. A functional infancy is an absolute requirement for optimal animal welfare. Studying a group of the original isolate monkeys (*Macaca mulatta*) produced in the Wisconsin primate lab of Harry F. Harlow, I made a decision to devote my career to the restoration of natural social networks and the prevention of psychopathology in zoo animals.

*Captivity and Behavior* (1979), co-edited with Joe Erwin and Gary Mitchell, was an early opportunity to survey the domain of an emerging field of psychological research, at the same time producing our first comprehensive contribution to the literature of nonhuman primate welfare. It contained one of the first contributions to primate enrichment, a benchmark chapter written by Hal Markowitz. For four decades, my research group has benefited from the thorough and exhaustive research of Professor Harlow and his collaborators, many of whom graduated to found productive primate labs of their own. One of Harlow's students, Gary Mitchell, was my research mentor at Davis. He encouraged me to explore the zoo as a research setting, and later sent other young scientists to probe this goldmine of scientific opportunity (Mitchell et al. 1991). Decades of experimental research on social deprivation in rhesus monkeys provided the necessary insight into developmental disorders in a variety of nonhuman primate species living in zoos. Vilified by animal rights groups, Harlow and his academic family is actually responsible for the documentation and discovery that inspired better standards and management practices for primates in captive settings (e.g. Blum 2002). Two of his scientific protégées generated the benchmark publication that elevated psychological well-being to the forefront of animal welfare science (Novak and Suomi 1988).

An equally powerful driver of animal welfare is the physical environment. Robert Sommer's classic paper "What do we learn at the zoo?" demonstrated how inadequate zoo environments influenced the attitudes and beliefs of visitors. Deprivation acts and stereotyped behaviors in animals coping with conditions of social deprivation are exacerbated by barren physical facilities. Sommer suggested the label "hard architecture" to classify environments bereft of naturalistic features. By contrast, "soft architecture" encourages social interaction, exploration, and activity. Soft space is by its nature flexible, comfortable, and user-friendly. These principles apply to animals and people alike. Beyond the zoo, Sommer identified hospitals, prisons, and airports as examples of hard architecture. Unfortunately, as Professor Sommer revealed in his iconic book *Tight Spaces* (1974), hard architecture has become the uncomfortable norm for all of us.

Early in my academic career I worked with my students to formulate a behavioral model for creating functional animal habitats in the zoo (Maple and Stine 1982; Maple and Finlay 1986, 1987). My forays into zoo exhibit psychology paralleled the aesthetic design revolution that resulted in the visionary landscapes at Woodland Park Zoo in Seattle. A developing partnership with the zoo designers Gary Lee and Jon Coe facilitated the intellectual framework that resulted from a continuing conversation now 35 years and counting. Zoo Atlanta and CLR ascended to prominence in tandem, the result of a harmonious and highly creative partnership in the psychology of design. Our crucible of new ideas and innovations were thoroughly vetted in the classroom during three decades of teaching an interdisciplinary course in "Psychology and Environmental Design" in the College of Architecture at Georgia Tech. I am grateful to Dr. Jean Wineman, now at the University of Michigan, who was my teaching partner and research collaborator for many productive years.

My ongoing solidarity with zoo keepers, curators, and veterinarians who have suffered the frustration of hard labor in substandard facilities, encouraged me to write books to encourage innovation and document the change. *Orang-utan Behavior* (Maple 1980a) and *Gorilla Behavior* (Maple and Hoff 1982) anticipated the concept of an "empirical zoo" (Maple and Lindburg 2008). My research group at Emory University and Georgia Tech responded to the need for information and new ideas by publishing dozens of papers in peer-reviewed journals on a wide variety of species. Along the way, we had the opportunity to organize a new journal to facilitate the emerging science of zoo biology. As we worked together to shape the new discipline, I am grateful for decades of helpful feedback I've received in an active correspondence with zoo colleagues. Their questions and suggestions have helped us to formulate better research projects, solve real problems, and reach an audience that has become truly international in scope. These friendly relationships gave me access behind-the-scenes in dozens of zoos and aquariums throughout the world. A career long friendship and scholarly partnership with Joe Erwin provided the motivation to generate social change through entrepreneurial leadership.

*Zoo Animal Welfare* has been written to encourage significant change in zoos, aquariums and similar institutions, and to engender a culture of respect for animals as envisioned by the editors who established the Animal Welfare series at Springer.

As the reader will quickly discover the book is more zoo than aquarium oriented. Welfare is an issue common to both and our ideas are applicable to both. Of course, zoos today often contain major aquatic exhibits, and aquariums are increasingly comfortable exhibiting birds, reptiles, marine mammals, and even large felids and ursids. The breadth of biodiversity in zoos and aquariums demands an astute and comprehensive understanding of welfare.

As a scholar in academia and a decision maker in zoos, I have enjoyed the unique perspective of one who could actually put my ideas to the test. In Atlanta, I led an organization that experienced for two decades nothing short of revolutionary change, and the institutional commitment to animal welfare is still working for my successors and former collaborators. In my opinion, zoo animal welfare works on many levels. It is a very strong marketing concept validating the organization's commitment to maintaining a healthy population of zoo animals. "Animal care," a common euphemism for welfare, is growing in importance as zoos strenuously compete for the support of their communities. Presently and long into the future, zoos that are known for their commitments to conservation and animal welfare will surely grow and prosper.

The zoos and aquariums of the future will be designed with welfare in mind, and they will provide the tools and the context to approach if not achieve a state of optimal animal welfare. Indeed, a shift to the priority of welfare has already begun. The fact that organized, accredited zoos in Europe are fully committed to zoo animal welfare is encouraging to those of us who work in the United States. We are not there yet, although there is broad agreement that we are moving in the right direction. The first step is to acknowledge the elevated priority of animal welfare, and to make the adjustments in programs and personnel to enact the change. Directors must lead the change, and ultimately work with their communities to fund the change. Welfare-oriented exhibits can be costly but their impact on the animals will be appreciated by every zoo visitor and easily justify the expenditure. The priority of conservation is needed to save wildlife; the elevated priority of welfare will ensure the survival of zoos and aquariums dedicated to protecting wildlife.

As the leader of institutions that sought to extend the reach of welfare and the science that sustains it, I understand how challenging it is to introduce and monitor substantive, even radical changes in facilities, programs, and operational routines. Optimal animal welfare requires big ideas that enable zoo animals to live large, long and well. Dr. Perdue and I have dedicated *Zoo Animal Welfare* to the universe of zoo professionals who work each day to provide the best possible life for the animals entrusted to their care, and to the current generation of students in colleges and universities who harbor a passion to someday work with exotic fauna in the zoo. In addition, we have dedicated this book to celebrating the life and legacy of our good friend and mentor, Hal Markowitz, who died while this book was in preparation.

Recent collaborations at the San Francisco Zoo have strengthened my appreciation for the zoo keeper's essential role in advancing the health and welfare of zoo animals. Keepers, curators, and veterinarians have been especially important

in helping us to formulate our ideas about wildlife wellness and welfare. In San Francisco, David Bocian, Graham Crawford, and Joe Fitting have been extremely helpful in the development of the wildlife wellness concept that we introduced in this book. I thank Chairman, David Stanton; CEO, Tanya Peterson and the Board of Directors of the San Francisco Zoo for encouraging and supporting our work.

Springer Series Editor Dr. Clive Phillips generously provided a detailed review of the manuscript, and we are grateful to other colleagues and friends for their helpful comments on selected chapters. Anette Lindqvist patiently and carefully managed the project from start to finish. Her encouragement was restorative at strategic moments in the long process of writing a book.

Bonnie and I are especially grateful for our collaboration and academic kinship with a continuous cadre of brilliant graduate and undergraduate students who have worked with us in California, Georgia, and Florida and at distant field sites in Africa and China. Without their efforts and profound insights this book would not be possible.

Zoos and Aquariums have made great strides in our lifetime, but as good as they have become, we believe they are still operating well below their full potential. Our ultimate success requires candor and critical thinking. Without an ongoing, objective self-appraisal, we cannot become credible advocates for the animals in our care. We trust that *Zoo Animal Welfare* will be regarded as a bold step in this direction.

Jupiter, FL

Terry L. Maple, Ph.D.

## About the Authors

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# Chapter 1

## Building Ethical Arks

*Zoos have the marvelous potential to develop a concerned, aware, energized, enthusiastic, caring, and sympathetic citizenry. Zoos can encourage gentleness toward all other animals and compassion for the well-being of wild places . . . To help save all wildlife, to work toward a healthier planet, to encourage a more sensitive populace; these are the goals for the new zoos.*

David Hancocks

The aspirations enumerated by our colleague David Hancocks reveal the awesome potential of the world’s best zoos and aquariums. Similar words and phrases can be found in the mission statements of a growing number of accredited institutions. One eloquent and visionary statement of purpose broke new ground when it was issued in 1980 by leaders at the Minnesota Zoo: “Strengthening the bond between people and the living earth”. Recently, the zoo modified its mission statement to read: “Connecting people, animals, and the natural world”. In San Francisco, the zoo lives by the motto: “Connect, care, conserve”. Such elegant phraseology frames each and every institutional commitment to ethical principles, core values, and superior operating standards and practices. On the ethical ark, the words matter.

In a comprehensive review of ethics in the zoo profession, Kreger and Hutchins (2010) took the position that ethics is about “what is right and what is wrong. Further, they argued, rather than focusing on *what is*, as scientists do, ethicists are concerned with what *ought to be* (White 1981). The mere fact that we have chosen to capture exotic fauna and deposit them in our zoos is an example of an “ethical paradox” as Conway (1995) explained it:

Zoos seek to inspire public interest in wild creatures and nature, to provide ecological education, and to help save wild species from extinction, but in doing so they confine wild animals away from nature and manage their lives. (p. 2)

Because so many animals live in world zoos (more than 750,000 are estimated to reside in the world’s accredited zoos), it is essential that we consider their welfare and

understand our ethical obligation to keep them healthy and well. Both government and private enterprise have recognized the growing importance of ethical operating principles, ethical decision-making, and ethical commitments. Specialized courses in ethics are now among the most important electives in our universities and graduate schools of business, law, and public policy. Non-profit organizations are particularly concerned about ethics given their reliance on funding from local and national foundations, corporations, and individuals.

## 1.1 Fall and Rise of the Phoenix

The collapse of Atlanta's city zoo in 1984 was a scandal that embarrassed government officials and reverberated throughout the nation. In an article in *Parade Magazine*, the Humane Society of the United States named the Atlanta Zoo as one of America's ten worst zoos. Due to a series of well-publicized (Desiderio 2000) ethical lapses including the secretive translocation of a dying elephant discovered buried in a shallow ditch in Cherryville, North Carolina, the Association of Zoos and Aquariums (AZA) discontinued Atlanta's membership. Twinkles the elephant became a national symbol of irresponsible zoo management and firmly positioned the Atlanta Zoo as the profession's number one pariah (Fig. 1.1). Fortunately, Atlanta's business and government leaders acted decisively to reverse the zoo's misfortune, implementing and funding in 1985 a bold plan for its revitalization. Rebranded as "Zoo Atlanta" the zoo was restructured as a non-profit corporation, owned by the City of Atlanta, but operated independently by a nine-member board of private business leaders. Time and again the new zoo board made decisions demonstrating that its first priority was the health and welfare of the zoo population. Its total institutional transformation brought the zoo into alignment with the highest standards of America's most accomplished zoological parks. Zoo Atlanta received AZA accreditation in 1987, just 3 years after the peak of its crisis.

By 1989, *Parade Magazine* was singing Atlanta's praises as the city that had turned its zoo around. Atlanta's experience proved that any zoo can overcome a substandard operating history if it commits to advancing the health and welfare of the animal collection. The rebirth of Atlanta's zoo, a virtual Phoenix story, was AZA's first successful privatization and a triumph of ethics over institutional inertia. Former Mayor Andrew Young proclaimed that Zoo Atlanta was the most successful public-private partnership in Georgia history, and it has been recognized nationally as a model conversion of public to private governance. Beginning his zoo life isolated and confined to a dilapidated steel, concrete, and tile cage, the lowland gorilla Willie B. ended his life in a simulated, landscaped jungle, a venerable silverback with his own harem of females and a collection of offspring (Maple 2001). He had become the symbol and brand for a revitalized Zoo Atlanta. New zoo exhibits were naturalistic in form and function, designed to encourage natural behavior, breeding, and normal parenting in gorillas and other species. As Wineman and Choi (1991) discovered, the 1985 zoo master-plan represented a complete shift in design philosophy when



**Fig. 1.1** Doing hard time at the Atlanta Zoo c. 1984 (R.D. Fowlkes)

compared to the 1950s era plan. The earlier plan prioritized entertainment, whereas the reform plan put the welfare of animals first. While the 1950s plan was clearly detrimental to animals, the new plan worked for animals and people, although visitors were now situated at a greater distance from them.

In his moving eulogy for Willie B. who died on February 3, 2000, Mayor (and Reverend) Young observed (Fig. 1.2):

We looked at him (Willie B.) in his cage, and we knew that he didn't belong there. He was brought here in captivity but he found a way to appeal to our hearts so that we were moved to find ways to set him free. And in setting him free, perhaps we set ourselves free to help us learn that we can live together in peace with all of the animals that God has created.

Since 1985, there have been many organizational setbacks experienced by zoos in America and around the world, including the global malaise that followed 9–11, and the catastrophic global recession in 2008. As debilitating as a financial crisis can be, no challenge compares to the crisis in public confidence that follows a disastrous animal incident. The death of an employee from attack by an elephant, whale, or leopard, an attack on a visitor by an escaped gorilla, tiger, or bear, or the loss of a beloved animal under mysterious circumstances is uncommon, but serious mistakes or errors of judgment can shut down any institution, or force dramatic changes in the way it can be operated. We believe that attention to the ethical foundation of zoos and aquariums serves to inoculate them against mismanagement and the public hysteria that often accompanies catastrophic events. Operating reforms are preferable *before* a crisis occurs, and should be implemented by proactive audits from boards, management, and outside experts who can provide systematic, objective evaluations of the facility, its operating units, and the health, safety, and welfare of the zoo population. In Atlanta, a Technical Advisory Board was established soon after the non-profit corporation was formed, comprised of area veterinarians, scientists, and the President of the Atlanta Humane Society, with the responsibility to provide advice on animal welfare and ethical practices to the CEO. Many zoos such as the Smithsonian National Zoo have