New book! Zookeeping: An Introduction to the Science and Technology,

Mark D. Irwin, John B. Stoner, and Aaron M. Cobaugh

Review by Sally Walker

Zookeeping is the most important job in any zoo; yet, in most countries that have zoos, even well-off zoos, zoo-keepers were often the least respected, the poorest paid, hardest working and most concerned about their animals.

In the last three decades, largely due to the growth of zookeeper associations, primarily in developed countries, the status and range of expertise of zookeepers has improved exponentially. Western zookeepers have many more options and potential to rise and to move to middle or higher level jobs in their own or better zoos.

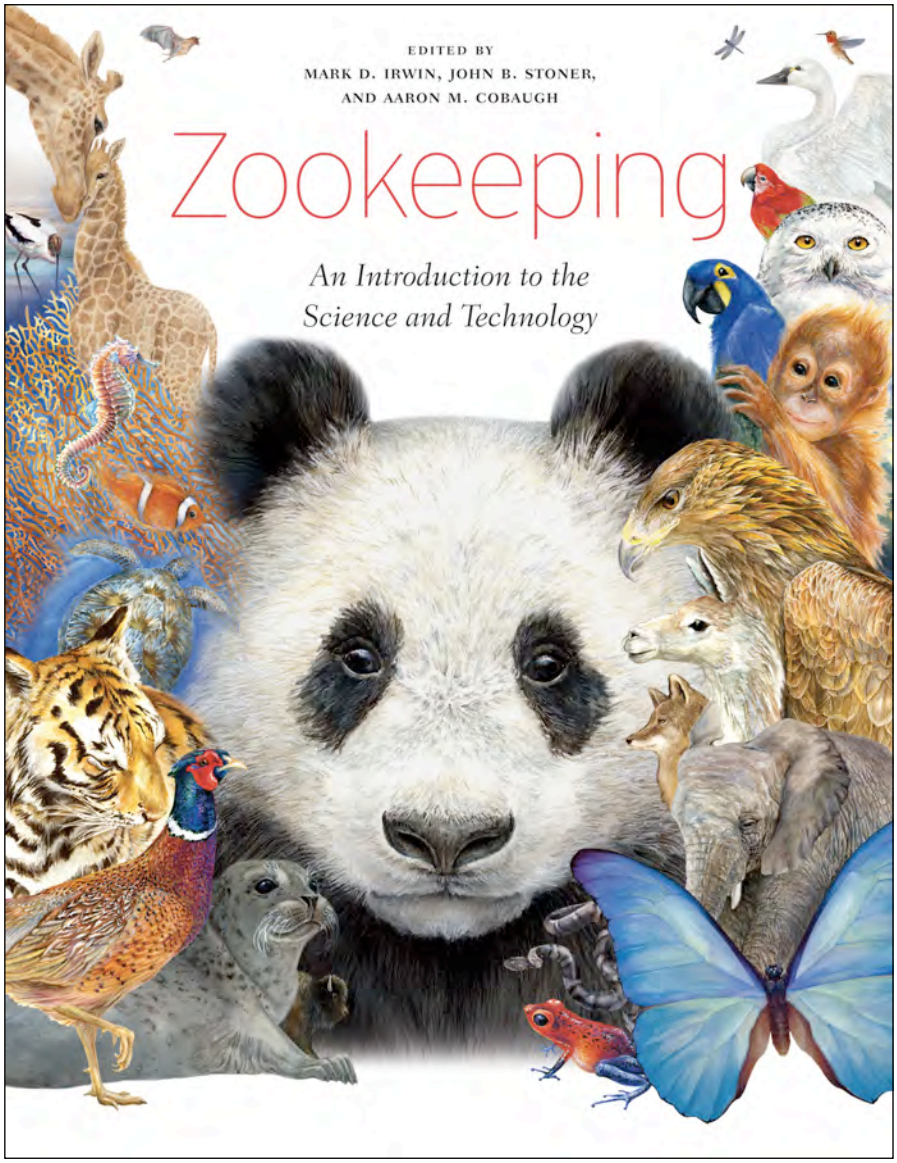
Zookeepers in most developing countries, however, do not have many options at all. They are underpaid, undereducated, overworked, ignored and disparaged. Despite that, many of them become attached to their animals and will go to any lengths to keep them happy, healthy and safe.

Also some semi-developing countries' zoos, such as Singapore Zoo and progressive others have uplifted the zookeeper position considerably. Nontheless, this serious anomaly with zookeepers in different cultures may be a major stumbling block for this excellent book and all the knowledge within. Unless the book itself can generate ***epiphany and action*** to address the countries and cities, the municipal, state and national governments, and current zoo staff to give more attention to zookeepers.

Zoo veterinarians who obtain the book will be familiar with the material in the vet sections, but other staff may not know that content. Likewise zoo vets and other staff may not be knowledgeable about the importance of zoo education and interpretation, public relations, zoo history etc. In all cases, although certain topics may not be familiar, they are still useful to know.

There are very few books dedicated to zookeeping and many of them are actually institutional manuals which often do not get circulated to other zoos, particularly zoos in other lands.

In discussion with Mark Irwin, first author, and familiar with all aspects of zoos and zookeeping, he related that "the uniqueness of the book is that it is very comprehensive and combines topics from dozens of other sources in order to present them specifically for the zoo situation." Dr. Irwin went on to comment that "the zoo staff often have a specific focus and lack a comprehensive view of all topics." Zoo vets, for example, may be familiar with all the vet-med chapters, but not knowledgeable about education and interpretation, zoo history, public relations, animal welfare, etc. Likewise staff in education, public relations, and zookeeping will benefit.



Comparatively, not many books are dedicated specifically to zookeeping, much less its valuable science and technology. Dr. Irwin opines that this book provides a much wider and deeper perspective than we may expect, even though it is obviously and unashamedly focused on zookeeping!

The book, Zookeeping, is 674 pages, weighs a lot and costs about $100.00 US. An e-version will be available, again at considerable cost for developing countries and surely for their zookeepers, most of whom do not even know English. The authors are working on a way around the cost for very needy zoos and staff but it will take time and that doesn't help the non-English speaking staff or keepers.

Thus Zoo Outreach Organization has adopted this problem and will do whatever possible to help spreading the knowledge and generating translations. We will begin small, by publishing something useful from the book in every issue starting now. Dr. Irwin has provided abstracts to circulate of every one of the 66 chapters of Zookeeping in this issue of ZOO's PRINT, our first for the year 2014. See back cover for information on obtaining this unique book.

Zookeeping - Introduction to the Science and Technology
Summary of the 10 Parts and 66 Chapters

Introduction
In zoos and aquariums, the zookeepers have a critical role in the care and welfare of the animals and as the animals' ambassadors to the public. Keepers need technical expertise and knowledge of science to provide the best animal care, educate the public, and participate in regional, national and international cooperative programs. As populations of endangered species dwindle, the role of zoo and aquarium keepers will become more important. Increasingly keepers need to professionally network, and globally synchronize their efforts. A working, practical knowledge of animal care, welfare and husbandry, an appreciation of the issues facing endangered species and the environment, an understanding of biological principles, the ability to interact with the public, and a broad perspective of the larger zoo community are all essential.

This book is an all-encompassing overview of foundational zoo and aquarium keeping theory, zoo operation and the most common practical techniques of zoo animal management. Contributed chapters from authors who are experts in areas of relevance to progressive keepers are intended to introduce topics to an entry-level keeper, and to promote consistency and the highest standards of zoo animal care. The book will be of value to entry-level student keepers seeking an orientation to the career, as a reference for non-animal care zoo staff, and it will serve as a training tool for experienced zoo managers.

PART I – Profession of Zookeeping
(Chapter) 1 - Profession of Zookeeper, Ken Kawata
The modern zoo, conceived and born in Europe, has been in existence for two centuries. Through a variety of challenges, zoos have grown, to structure themselves for institutional survival and to balance the internal needs and the requirements of our time. This chapter outlines the basic role of the keeper as an integral part of zoos and aquariums. Discussion is focused on: how zoos and aquariums have evolved into multi-disciplinary entities with diverse demands cast upon them; how the keeper's duties have increased with time; that keepers must effectively comprehend both wild animals and humans; that communication skills are essential; that learning is a life-long process; and that it is vital for the keeper to make daily contributions toward organizational goals, to advance science as well as to strengthen a positive image of zoos and aquariums as cultural and public institutions.

2 - Professionalism and Career Development, Jacqueline J. Blessington
Keepers are generally employed by an institution to perform a job. It is then up to the keeper to determine whether that employment is a profession or merely a job, and whether it then develops into a career. This chapter will discuss the differences between a job and a profession as they relate to zookeeping. Keepers are passionate about what they do and most view their work as a profession. This chapter will aid the reader in acquiring a job in the zoo and aquarium field and provide information on how he or she can then develop a professional career within that field. Topics will include: getting started in a keeping career, basic principles for writing cover letters, resumes, curriculum vitaes, and job applications, how to perform well at an interview, the importance of professional image and mindset in a job, and a discussion of career tracks for keepers.

3 - Communication and Interpersonal Skills for Keepers, Judie Steenberg and Mark D. Irwin
In a zoo or aquarium, "animal people" must work with people. Keepers will need to share the workplace with co-workers, supervisors, managers, the staff of other departments, and of course zoo visitors. They are the primary spokespeople for the animals and must effectively communicate information about them to others. Just as with the basics of animal keeping, personal communication skills are timeless. Communication skills are important tools that enable keepers to do their job. Technology, which moves along quickly, has become a tool for communication. Also, conflict may occur in any workplace and its resolution requires effective communication and skills that can be developed. This chapter will help keepers become better communicators in the workplace and provide a strong, clear voice for the animals.

PART II – Evolution of Zoos
4 - Zoo History, Josef Lindholm
Beyond the story of the individual animals that keepers work with, there is a much bigger story, which when understood, may put these animals, and the places they live in, and the work that is done with them, in a completely different light. This chapter will provide a brief overview of the history of animals in captivity. Rather than follow a strictly linear time-line, it will focus on various factors that lead people to keep animals in progressively complex ways. Topics include: the evolution of the modern zoo from various forms of early collections, factors affecting the species composition of modern zoos, the changing role of zoo professionals and the idea that zoo history is to be enjoyed.

5 - Today's Zoos, Gordon McGregor Reid
This chapter provides basic information about contemporary zoological gardens in relation to animal keeping. It covers the nature, purpose, standards, and general direction of zoos and the opportunities for external collaboration, especially in support of conservation and science. Most zoos major in animal welfare, public recreation or entertainment, education, conservation, and science. This chapter focuses on conservation, international partnerships, and science, and how they closely relate to the mission, vision, and values of modern zoos.

6 - Animal Ethics and Welfare, Joseph C. E. Barber and Jill D. Mellen
Modern zoos and aquariums identify four main goals or justifications for housing wild animals: education, entertainment, research, and conservation. This chapter will discuss these goals in broad terms as they relate to the ethics of keeping wild animals in captivity. Specific discussion will focus on why animals are housed in zoos and aquariums, animal welfare, animal rights, conservation and common ethical and welfare issues faced by keepers.

PART III - Workplace Safety and Emergencies
7 - Workplace Safety, Ed Hansen
This chapter will address the specialized elements of working with exotic animals and combine those elements with standards addressed by the United States Occupational Safety and Health Administration (OSHA), thereby creating a reference that addresses employee safety in the zoo and aquarium professions and ensuring that keeper safety receives the same attention as animal welfare in the workplace. While OSHA regulations affect facilities within the United States, other countries may have similar and specific regulations regarding safety and employee welfare

that will apply to animal facilities worldwide. Each zoo and aquarium should have a basic safety plan in place for its employees. This safety plan will normally address the hazards of working with dangerous exotic animals. It should take the form of written policies and include employee safety training.

8 - Emergency Readiness and Crisis Management, Donald E. Moore
Emergencies are unavoidable in a zoo or aquarium, while the probability of some can be decreased through effective planning. In all cases zoo and aquarium professionals can and should be prepared. Emergencies include: fire, weather/environmental emergency, injury to visitor or staff (including venomous animal bite), animal escape, chemical spill, unauthorized human in animal exhibit, inappropriate human-animal interaction, bomb threat, missing child, armed robbery, and an overaggressive visitor. This chapter will provide basic information about emergency readiness as it affects, and is affected by, the keeper position. Topics include the basic types of emergencies, the importance of being prepared to respond to an emergency, institutional versus individual responses to emergencies and the keeper's role in emergency response.

9 - Basic First Aid, Andrew A. Birr
First aid is the immediate care given to treat an injury or illness by a lay rescuer until professional medical treatment can be provided. Many minor illnesses or injuries do not require treatment beyond basic first aid and often only require minimal equipment and action. In zoos and aquariums, a first aid program can provide numerous benefits that include saving lives, eliminating the need for employees to be seen at medical facilities, preservation of employee productivity, and cost savings. It also provides a rapid response to emergencies in which severe or life-threatening injuries may occur. This chapter provides information on first aid and will discuss: safety measures for first responders, legal liability, common techniques used in cardiopulmonary resuscitation (CPR), automated external defibrillation (AED), typical medical and traumatic emergencies, proper first aid responses to common emergencies, and the components of a basic first aid program.

PART IV - Zoo Animal Management
10 - Daily Routine and Basic Husbandry, *J. B. Stoner*
A keeper's daily routine in a zoo or aquarium, when properly conceived and implemented, will help maintain keeper staff relationships and ensure the best welfare possible for the animals. Efficiency in the completion of basic daily tasks will result in more time and resources for the other interesting aspects of the job. This chapter provides insight into the daily husbandry procedures and day-to-day care of zoo and aquarium animals, especially as these things relate to the basic care of animal enclosures. Discussion will relate to the basic tasks of animal observation, exhibit cleaning, feeding, watering, and record keeping. Other topics include: the importance of understanding the zoo's geography, inspection of animal enclosures, the keeper's uniform, the importance of using shift gates to move animals, commonly used tools and their upkeep, and the use of ergonomics to maintain good physical condition.

11 – Taxonomy, Gary L. Wilson
Modern zoos and aquariums are partners in a worldwide effort to conserve the biodiversity of our planet. For keepers, understanding taxonomic principles will help in caring for each species since closely related species share characteristics and have similar needs. Knowing how an animal is classified helps the keeper teach the visitor about the species and aids the keeper in working with curators to manage the zoo's animal collection. Familiarity with how different species are classified and understanding the relationships between groups will also make the scientific literature more accessible to the keeper, facilitating the application of discoveries from the field to better manage captive specimens. This chapter discusses the basics of taxonomy, binomial scientific names, hierarchical classification of taxa, naming conventions, and pronunciation of scientific names. It will also discuss the difference between evolutionary taxonomy and phylogenetic systematics and principles of systematics including monophyly, polyphyly, and paraphyly.

12 - Anatomy and Physiology (Part 1: Invertebrates), Douglas P. Whiteside
Increasingly, zoos and aquariums are displaying a greater number of invertebrate species as part of their collections. Keepers must provide care to these diverse species. Knowledge of comparative anatomy and physiology between the various taxa is useful for the keeper to develop an understanding of unique anatomical arrangements in less well studied species. This knowledge will better enable keepers to understand and meet the daily needs of these animals through husbandry and care procedures, and will serve as a valuable resource when making animal management decisions. This chapter will focus on terrestrial members of the phylum Arthropoda; the Mandibulata which includes insects (hexapods), the myriapods (millipedes [diplopods] and centipedes [chilopods]), and the Chelicerata which contains spiders and scorpions (arachnids).
At the conclusion of this chapter, the reader will appreciate and identify key features of the external and internal anatomy and physiology of terrestrial invertebrates.

13 - Anatomy and Physiology (Part 2: Vertebrates), Douglas P. Whiteside
A wide array of vertebrate species is found in zoos and aquariums. Despite a tremendous range of morphological appearances, the general body plan of vertebrate species is fairly well conserved with fundamentally similar organ systems. Keepers must provide care to fish, amphibians, reptiles, birds and mammals, and knowledge of the comparative anatomy and physiology of the various taxa is useful for developing an understanding of unique anatomical arrangements in less well studied species. This knowledge will better enable keepers to understand and meet the daily needs of these animals through husbandry and care procedures, and will serve as a valuable resource when making animal management decisions. Readers will appreciate and identify key features of, and differences in, the external and internal anatomy and physiology of vertebrates. They will also understand directional terminology as it relates to the external anatomy of vertebrates, and be familiar with sites of blood collection.

14 - Stress and Distress, Murray B. Fowler
Stress is often spoken of in everyday conversation, frequently by persons with little or no understanding of what is actually happening in themselves or their animals. In fact, stress is necessary to make it possible for both domestic and wild animals to cope with an ever-changing environment. Each reaction to a stressor has adaptive significance. Stress is the cumulative response of an animal to interaction with its environment via receptors (Fowler 2008; Moberg 1987). Intense or prolonged stimulation induces detrimental responses (distress) that may be fatal (Breazille 1987, 1988). Keepers should be ever-vigilant to conditions that may contribute to the development of distress in their charges. This chapter will enable zoo keepers to understand the principles and concepts of stress and distress in animals, provide practical examples to illustrate principles, and encourage zoo and aquarium keepers to consider animal stress in animal management activities.

15 - Physical Restraint and Handling, Murray B. Fowler
Animal restraint and handling practices coevolved with the domestication of animals. Early methods were based on the personal experiences of the keeper. Later, the art and even the science of animal handling could be committed to the written word and taught to students who wished to become more skilled in the handling of animals. Even today, those who handle animals are experimenting with new nets, snares, and restraint cages to provide safer and more efficient restraint. It is important that the keeper understand the biology and behavior of each species under their care. This chapter will enable zoo and aquarium keepers to understand the principles and concepts of animal handling, provide practical examples to illustrate principles for major taxa, and encourage keepers to consider animal welfare in all restraint procedures. Discussion will cover common tools, ropes and knots, and potential medical problems associated with animal handling.

16 - Nutrition, Eduardo V. Valdes
Meeting the nutritional needs of wildlife outside their natural environment is a complex process if they are to be maintained in a healthy condition and to reproduce. The conservation and husbandry objectives of North American zoos and aquariums require the design of sound nutrition and feeding programs to provide adequate nutritional support for all animal species while meeting their physiological and psychological needs throughout development. This chapter will provide basic information about animal nutrition as it applies to the husbandry and care of zoo and aquarium species. The reader will understand factors to consider when formulating zoo and aquarium diets, basic concepts in animal nutrition, the role of nutrition in preventive medicine, basic concepts in food preparation, organization of an ideal commissary, importance of assessing body condition scoring (BCS), some important nutritional diseases, the role of the keeper in feeding, and the design of practical diets.

17 - Records Keeping, Jean D. Miller
Of all zoo employees, keepers have the closest association with the animals in an institution's collection. As such, they are the ones who know the details of daily feeding, the normal behaviors and activities, and the physical condition of the animals in their care. This information is of no overall value unless it is shared by colleagues, both at the facility and at other facilities around the globe. The best mechanism for sharing this information is the written record. This chapter provides basic information about animal record keeping as it relates to zoo and aquarium keepers. Discussion will include: the history of records keeping; the keeper's role; characteristics of good records; daily keeper reports; how information is used; the role of regulatory permits; animal shipping records, animal medical records, International Species Information System (ISIS), and the Zoological Information Management System (ZIMS).

18 – Identification, Erika K. Crook
Animal identification (ID) is an important part of successful animal management in zoo and aquarium collections. Ideally, animals will be tracked throughout their lifetime for husbandry, medical, reproductive, and management-related activities. Each zoo and aquarium will determine the best approach for their animals, although some regulatory agencies have recommendations or requirements. Primary identification is the method that is used most frequently to definitively identify the animal (e.g., microchip) or is easiest to see or read (e.g., ear tag). Secondary identification will provide additional information about the individual and help identify it if the primary method fails. This chapter will discuss methods of animal identification used at zoos and aquariums. The reader will become familiar with: characteristics of an ideal identification method, passive identification, external active identification, internal active identification, recommended sites for microchips or passive integrated transponders (PIT), and species-specific methods of identification.

19 – Reproduction, Linda M Penfold
This chapter will provide basic information about animal reproduction for zoo and aquarium keepers. Reproduction is not only an important part of species propagation but is also part of the normal repertoire of animal behaviors. Zoos and aquariums must produce animal offspring to maintain a genetically diverse sustainable population while minimizing the production of surplus animals. They rely on diverse management strategies including recommended breeding, contraception, animal moves between institutions, and animal separations. An understanding of the species' basic reproduction will help achieve success and keepers need to be vigilant in observing reproductive behaviors to time breeding introductions and anticipate births. The reader will understand: the diversity of reproduction strategies in the animal kingdom, the keeper's role in noting reproductive behaviors, the importance of accurate record keeping, characteristics of pregnancy and pseudopregnancy, the use of contraception, the relevance of appropriate environment and social housing, and the use of assisted reproductive techniques.

20 - Population Management, Linda M Penfold
Populations are dynamic, responding to influences such as environment, disease, and demographic fluctuations. Zoos and aquariums must manage their animal populations because they care for a limited number of individuals and population problems become magnified in small populations. For a species to survive, it is important that it contains the genetic diversity to be "evolutionarily flexible." This chapter provides a general overview of population management for zoo and aquarium keepers. Readers will understand: the hazards associated with small populations, the idea that a critical number of animals are required if a population is to be sustainable, the definition of a founder animal, the role of demographics in population management, and the different tools that managers may use to manage populations.

21 - Management of Neonatal Mammals, H. B. Frazier, Janet Hawes, Karla J. Michelson
Techniques and philosophies regarding neonatal care of animals continue to evolve in zoos and aquariums. The cornerstone of neonatal care should be reproduction in species-appropriate family groups that meets the physical and behavioral needs of animals and supports healthy and sustainable captive populations. Keepers need to think about infant care from a proactive perspective where sustaining the normal maternal and social group dynamics is important, rather than from a neonatal critical care (reactive) perspective. Keepers should support the family group so that neonates stay with their mothers as a best-care practice. Creating the optimum situation for a positive outcome requires action and planning. This chapter will discuss birth management planning (BMP), neonatal assessment, record keeping, team communication, hand-rearing alternatives, hand-rearing guidelines, and ethical considerations.

22 - Management of Geriatric Animals, Cynthia E. Stringfield
With increasing knowledge, and advances in husbandry and medical care, many zoo and aquarium animals live well past their life expectancy in the wild. Old age itself is not a disease or diagnosis but geriatric (aged) animals have special care requirements and often require more time and atten-

tion than young healthy animals. Proper husbandry throughout an animal's life can not only extend its life but prevent or delay some common geriatric diseases. This chapter provides basic information about geriatric animals and their care for keepers. Readers will understand: the importance of knowing the typical longevity of a species and the age of their individual animals; health concerns of geriatric animals; use of husbandry to prevent or manage geriatric diseases; current care requirements of geriatric animals, nutrition and feeding, the importance of diagnosis in determining treatment, palliative care, or euthanasia; ethical issues relating to euthanasia; and grief management for keepers.

23 - Transportation and Shipping, Andrea Drost

Live animal shipping can be challenging. Whether animals are being moved domestically or internationally, the shipments must occur quickly and efficiently without jeopardizing their well-being. The primary goal is to limit stress on the animal, as well as to ensure an efficient shipment so that all goes well in a timely manner. A general sequence of steps to live animal shipping will be described and include: obtaining background information on the animal to be transported; permitting and health requirements; crates and crate training; modes of transportation; shipment date selection; communication between relevant parties; documentation; "day of" arrangements; shipment tracking; confirmation of successful transport. Readers will understand: general methods of and approaches to the transportation of zoo and aquarium animals, the importance of planning, the preparation required, specific considerations relating to each step of the live-animal shipping process, and approaches to transportation of common zoo taxa.

24 - Exhibit Design, Patrick R. Thomas

Designing an effective zoo or aquarium exhibit (enclosure) requires a team approach that draws upon the diverse expertise of a variety of zoo staff. The planning team should consist of curators, field biologists or others with detailed knowledge of the species' natural history and habitat, architects, construction personnel, educators, horticulturalists, veterinarians, and keepers who work with the species on a regular basis. With their knowledge of the animals and animal care, keepers should be part of the design team. This chapter will identify the elements that go into the creation of successful animal exhibits. Readers will comprehend: the design components that address the physical, behavioral, and social needs of the animals, encourage the expression of species-typical behaviors, and enhance well-being; the essential details that relate to the keeper's work routine and safety; which aspects of the design inspire visitors and positively influence their perception of the animals and zoos.

25 - Zoo Horticulture, Jay H. Rost

Zoo horticulture includes exhibit and landscape design and maintenance, management of a plant collection, plant conservation, and the supplying of browse for animal enrichment programs. It also includes maintenance of lawns and the plants in other public areas, forest management (arboriculture), and the propagation of new plants for use in or around an animal exhibit. In some cases a zoo will have its own horticulturalist; otherwise botanical work may be the responsibility of keepers. Regardless, an appreciation of horticulture will aid a keeper in providing the highest quality of animal care and effective interpretation of biology. Readers of this chapter will: understand the benefits of horticulture at a zoo or aquarium; understand horticulture as it relates to exhibit design and regular day-to-day plant maintenance; receive guidance on how to operate in a manner that benefits both the animals and the plants associated with the animal's exhibit.

PART V – Zoo Animal Husbandry and Care

26 - Husbandry and Care of Small Mammals, Donald E. Moore and Michelle R. Farmerie

There are over 4,500 species of mammals. Most are less than one-half meter (19 in.) long—and are often referred to in zoos and aquariums as "small mammals". Basic concepts for management of all mammals run throughout small mammal husbandry, including guidelines for species-appropriate exhibit size, bedding, and nutrition. This chapter will emphasize management of small mammals in human care. The reader will understand: the interrelationship of mammal behavioral needs and keeper behavior, and important safety precautions keepers should take to protect themselves and their animals; best practices for furnishing and cleaning small mammal enclosures; key physical and behavioral traits of small mammals. Discussion will include an overview of the taxa's natural history, unique external anatomy, the zoo or aquarium habitat (exhibit or enclosure), basic husbandry practices, specialized tools and equipment, animal handling methods, behavior, reproduction, transportation, veterinary care, and conservation.

27 - Husbandry and Care of Hoofstock, B. A. Huffman

Hoofstock (ungulates; hoofed mammals including both artiodactyla and perissodactyla), display an incredible diversity of forms, adaptations, and lifestyles—features which make them an enduring part of zoo collections around the world. They share traits that can present challenges in zoos; primarily their adaptations for herbivory and predator avoidance. Readers of this chapter will understand: anatomical terms specific to ungulates; impacts of species-specific biology on housing, nutrition, and social management; effects of ungulate behavior and keeper demeanor on animal and keeper safety; best practices for encouraging species-appropriate natural behaviors; principal issues involved in the reproductive and medical management of ungulates. Discussion will include an overview of the taxa's natural history, unique external anatomy, the zoo or aquarium habitat (exhibit or enclosure), basic husbandry, care, and management practices, specialized tools and equipment, animal handling methods, behavior, reproduction, transportation, veterinary care, and conservation.

28 - Husbandry and Care of Carnivores, Adrienn A. Crosier and Michael T. Maslanka

The mammals classed in the order Carnivora are extremely diverse and are popular with zoo and aquarium visitors. The term "carnivore" will be used throughout this chapter, but in this usage the term does not refer to specific taxonomy or diet, but will be used as a general grouping of animals based on husbandry and care needs (and thus will not include the pinnipeds). This chapter describes the basic principles of working with carnivore species in a zoo as applied by the keepers. Readers will understand: the basic anatomy of carnivore species, guidelines for housing (exhibit or enclosure), effects of species biology on enrichment and training programs; specific reproductive and veterinary issues; key conservation initiatives for carnivore species. Discussion will also include an overview of the taxa's natural history, its unique external anatomy, basic husbandry, care, and management practices.

29 - Husbandry and Care of Primates, Coleen McCann

The primate order is diverse and includes the prosimians, New World monkeys, Old World monkeys, apes, and humans. Primates share a suite of characteristics that unite them as a taxonomic group and distinguish them from other mammals. This chapter discusses the techniques and best husbandry and management practices of keepers caring for primates in zoos. Readers will understand: the natural

history of primates; basic anatomical features of primates; the complexity of primate behavior and social systems; key features of primate enclosures; technical skills important for working with primates and for developing a rapport with individual primates; basic observational skills needed for managing primate social and clinical health; the importance of operant training techniques in husbandry practices; principles and techniques for managing primate reproduction and infant care; the conservation status of primates and important *in situ* and *ex situ* efforts being taken by various organizations.

30 - Husbandry and Care of Elephants, Chuck Doyle and Daryl Hoffman

This chapter provides an entry-level keeper with an introductory overview of basic elephant husbandry, care, and management in zoos. Institutional elephant management programs will vary to meet the individual institution's goals and needs. There are many ways to care for elephants, but it is critical that each institution has the essential components necessary for a successful program, such as those presented in the Association of Zoos and Aquariums (AZA) course, Principles of Elephant Management. Readers of this chapter will understand: anatomical adaptations of elephants; effects of elephant biology on housing, nutrition, and social management; basic components of elephant behavior as they relate to animal and keeper safety; practices for promoting species-appropriate behaviors; elephant management methods.

31 - Husbandry and Care of Marine Mammals, Gerald H. Meijer

The category of marine mammal does not refer to a specific order or taxon; animals from several taxa are grouped together based on husbandry and care needs and because of the marine (salt water) environment to which they have adapted. Zoos and aquariums (including marine mammal parks and dolphinariums) commonly keep Pinnipedia (seals, sea lions, walruses), Odontoceti (dolphins, porpoises, orcas), and Sirenia (manatees and the dugong). This chapter provides basic information about the husbandry, care, and management of marine and semiaquatic mammals in zoos and aquariums. Readers will understand the basics of marine mammal husbandry and care including: enclosure and environmental needs; food and food preparation requirements; propagation and maternal care; environmental enrichment and training needs; handling and transportation.

32 - Husbandry and Care of Birds, Ted Fox and Adrienne Whitley

Members of the class Aves are the most widespread of vertebrate animals on the planet. Birds can be found in every habitat on the continents, and some even spend the majority of their lives at sea, returning to land only to reproduce. All birds typically share certain characteristics: feathers; beaks; sturdy, lightweight skeletons; and egg-laying. This chapter will provide an introduction to the husbandry, care and management of birds for keepers in zoos and aquariums. Topics of discussion will include: avian families; avian physiology; exhibit design and maintenance; formulation and presentation of diets; reproduction; the form and function of bird eggs; major disease concerns; management strategies, including mixed-species exhibits; avian-specific terminology.

33 - Husbandry & Care of Reptiles, AM Cobaugh

Reptiles include: Crocodylia (crocodiles), Testudines (turtles), Rhynchocephalia (tuataras), and Squamata. The order Squamata is comprised of three distinct suborders: Sauria (lizards), Serpentes (snakes), and Amphisbaenia (worm lizards). Reptiles have been historically linked to amphibians in the field of herpetology, although they are biologically and taxonomically distinct. This chapter will provide zoo and aquarium keepers with an overview of reptile husbandry, care and management. Topics will include: the unique behavior and physiology (endothermic metabolism) of reptiles and how it affects housing, feeding, and reproduction; best practices for daily care, handling, housing, and transport of reptiles; specific tools, enclosures, and training for working with dangerous (venomous) species; key habitat and environmental requirements; medical management; conservation and research of threatened species.

34 - Husbandry and Care of Amphibians, A.M. Lentini

The amphibians include three orders: Gymnophiona (Apoda), the legless amphibians; Caudata (Urodela), the newts and salamanders; and Anura (Salientia), the frogs and toads. Although there are exceptions, most amphibians have a two-phase life cycle with an aquatic larval stage and a terrestrial adult phase. All amphibians have a permeable skin that serves as a major surface for water absorption and gas exchange. Nearly one third of the world's amphibian species are threatened, making them a priority conservation group. This chapter provides an overview of amphibian husbandry, care and management for zoo and aquarium keepers. Topics include: anatomical and physiological terminology; the unique physiology of amphibians as it affects housing, nutrition, and reproduction; best practices for daily care, handling, and transport; key habitat and environmental requirements; medical management.

35 - Aquarium Science: Husbandry and Care of Fishes and Aquatic Invertebrates, Bruce Koike

Many parallels exist between terrestrial animal care and the husbandry of fishes and aquatic invertebrates. Minimizing stressors by implementing husbandry and management best practices should be the common goal of all animal keepers. Because aquatic animals and the environment in which they live are inherently different from their terrestrial counterparts, understanding these differences and consistently applying industry standards of care are keys to being a successful keeper. Though the term "keepers" will be used throughout this chapter, individuals who care for fishes and aquatic invertebrates at a zoo or aquarium are often called aquarists. This chapter serves as a starting point to understand: important processes that occur in the aquarium, and ways of managing water quality; life support system principles and operations; core aquatic animal husbandry responsibilities; husbandry requirements of selected species.

36 - Husbandry and Care of Terrestrial Invertebrates, Tom Mason and Aaron M. Cobaugh

There are literally millions of invertebrate species, many of them terrestrial. Keepers in zoos and aquariums should recognize the unique challenges their husbandry, care, and captive management present. This chapter will concentrate on the generalized groupings of species that are regularly kept in zoos. Most species are arthropods, but some mollusks (molluscs) will also be discussed. Topics include: the general anatomical terminology, similarities, and differences among the varied taxa; how anatomy, physiology, and behavior affects housing and feeding; best practices for the daily care, handling, housing, and transport of these animals; general environmental requirements; the unique requirements of certain species and the challenges they pose to keepers.

PART VI - Animal Behaviour, Enrichment and Training

37 - Introduction to Animal Behavior, Michael Noonan

Museums share similar goals with modern zoos and aquariums. The goal in both types of institutions is to give visitors educational experiences that inform them about the

natural world. Like museums, modern zoos make great efforts to display animals in realistic recreations of their natural habitats. However, zoo and aquarium keepers need to be concerned with animal husbandry, care, and management. Live animals may destroy parts of their exhibits and they have special needs relating to diet, veterinary care, containment, backup holding facilities, and so on. This chapter will explain how animal behavior is central to the mission and the operation of zoos and aquariums. It will illustrate the value of live-animal displays, and it will describe the use of ethograms and behavioral budgets in modern zoos and aquariums.

38 - Applied Animal Behavior, B Diane Chepko-Sade
An understanding of animal behavior is invaluable to a keeper in maintaining his or her safety around animals, obtaining the animal's cooperation in basic husbandry procedures, providing the highest quality of animal care, and in interpreting the animals' behavior to the public. This chapter will discuss: the science of ethology; the study of animal behavior; the difference between trained and domesticated animals; classifications of behaviors based on their function; classifications of behaviors based on how they are organized within the animal; the importance of early experience in animal development, and how hand-rearing can impact development; how to interpret species' specific behaviors to promote safety and animal care; how to recognize and mitigate stress in the lives of captive animals; the role of behavioral research in zoos, and how keepers can facilitate and learn from it.

39 - Animal Behavioral Concerns, Joseph C.E. Barber
Caring for animals in zoos and aquariums is challenging, especially when knowledge about many species is still being gathered. The responsibility shouldered by keepers is matched by the significant amount of time and effort they willingly invest into doing their work. This chapter explores some of the roles that keepers play in the behavioral management of animals in zoos and aquariums, focusing on some of the behavioral concerns that are encountered, sometimes caused, and often successfully addressed by keepers. The following topics will be discussed: animal behavior and the scientific method; the relationship between behavioral concerns and welfare; the future role of keepers in identifying and addressing behavioral concerns. Examples of behavioral concerns will include infanticide and parental neglect, self-injurious behaviors, and abnormal repetitive behaviors (ARBs) or stereotypies.

40 – Enrichment, David J. Shepherdson
Enrichment is a field of applied scientific study with its own guiding principles and underlying concepts. In zoos and aquariums, "environmental enrichment" improves animal welfare through changes in the animals' environments. There are also other valid reasons for it. Animals living in environments that cater to their needs and stimulate natural patterns of behavior tend to be more engaging and interesting to visitors. Environmental enrichment also supports conservation activities because endangered species are more likely to breed successfully when enrichment is part of their husbandry. This chapter provides a review of environmental enrichment for zoo and aquarium keepers. Topics will include: the history and evolution of environmental enrichment; the theoretical basis of enrichment and its relationship to animal welfare; goals and objectives of enrichment; different kinds of enrichment; how scientific research contributes to enrichment and how it evaluates enrichment.

41 - Enrichment Programs, Tammy M. Root
Enrichment programs are designed to challenge the animals physically and psychologically, allow them to exhibit their natural behaviors, and allow them control within their environment. In a captive environment, zoo and aquarium keepers control when and what an animal is being fed, where it is moved to within its environment, and when it is given medical care. Environmental enrichment offers animals with an opportunity to express themselves through normal species-typical behaviors, and when incorporated into animal husbandry, it can improve animal welfare. This chapter will present key points for establishing a successful enrichment program, using the framework known as SPIDER. Readers will understand: the importance of developing a formal enrichment program; how to use the SPIDER framework; the challenges of using SPIDER; the value of SPIDER as a useful tool.

42 - Operant Conditioning, Gary L. Wilson
Conditioning is a process that changes an animal's behavior. Training, behavior modification, desensitization, habituation, and learning all involve conditioning. Conditioning may affect the frequency or form of a behavior, how the animal responds to specific stimuli (things perceived by the animal), or a combination of these attributes. There are different kinds of conditioning. Classical conditioning, a type of learning wherein the subject makes an association between two or more stimuli, will be touched upon, but the chapter will focus on operant conditioning in which the subject makes an association between its behavior and the consequences of that behavior. Topics discussed include: the reasons why a zoo or aquarium keeper might condition the behavior of animals; the difference between classical and operant conditioning; the basic procedures and terminology of operant conditioning; general principles to follow in applying operant conditioning techniques; basic guidelines to follow when addressing problems during conditioning.

43 - Husbandry Training, Ken Ramirez
Husbandry training refers to training animals to assist in their own day-to-day care and management. It provides animals with mental stimulation and physical exercise, and can improve life for both the animal and the keeper. Long-term husbandry training can provide the added benefit of saving enormous time and money on individual procedures, and more importantly, it reduces stress for the animals and makes husbandry, care, and management procedures far safer for all involved. Ultimately it improves animal welfare and well-being. This chapter will provide: an appreciation of the value of training for zoo and aquarium animal care; an introduction to behavior modification, desensitization, and habituation for keepers; an understanding of basic animal behaviors that, once trained, form the foundation for more advanced behaviors; an understanding of some common training mistakes; a review of some practical applications for husbandry training.

PART VII - Veterinary Care

44 - Principles of Animal Health, Mark D. Irwin
Animal health is a priority of zoos and aquariums; it is something that other public attractions do not have to consider, and it is at the heart of a keeper's responsibilities. Good animal health requires a conscious effort on the part of keepers and an effective collaboration between all departments, including animal care, veterinary medicine, and administration. Keepers can facilitate this collaboration through good communication, observation, and cooperation. Knowledge of key principles of animal health will be critical. The primary focus of this chapter will be on key principles of animal (physical) health and related medical principles. Psychological health will be covered in other chapters. Topics include: the keeper's role in promoting animal health; basic principles of health and disease; indications of illness in animals; animal health–related terminology; infectious disease; disease transmission and biosecurity; immunity and disease resistance; objectives of veterinary disease treatment and management.

45 - Veterinary Care & Technology, Tracy L. Anderson
The veterinary teams in a zoo or aquarium works with the keepers to monitor, maintain, and improve the health of the zoo or aquarium's animals. The first and foremost concern of a keeper is animal care, of which health management in concert with the veterinary and supervisory teams is paramount. This chapter will provide an overview of zoo and aquarium animal hospital principles, and help the reader to: understand the structure of the veterinary team; know how to interact with the veterinary team during routine and emergency procedures; view the veterinary team as a resource; appreciate the importance of observational skills and communication; identify the differences between domestic and wild animal veterinary medicine; explore the importance and practical application of operant conditioning for veterinary procedures; prepare for veterinary procedures; understand basic surgery room etiquette; understand veterinary hospital management and hospital safety concerns.

46 - Zoonotic Disease, Scoot P. Terrill
The simplest definition of a zoonotic disease is "a disease that is transmitted between animals and humans." The World Health Organization website states that more than 200 zoonotic diseases have been described. According to the Centers for Disease Control and Prevention, approximately 75% of the newly emerging infectious diseases affecting humans and 60% of all human pathogens are potentially zoonotic. Zoonotic disease biology and prevention should be an important consideration for zoo and aquarium keepers, with regard to the health of employees as well as the visiting public. The goals of this chapter are to: provide a basic understanding of disease biology, terminology, and transmission; discuss the components of an employee disease prevention program; discuss the components of minimizing zoonotic disease risks for the public; provide a summary of some of the more important zoonotic disease issues in the zoo and aquarium environment.

47 - Preventive Medicine, Noha Abou-Madi
The goals of a preventive medicine program are to prevent and control diseases and medical problems that occur during the normal life of animals. It should also effectively prevent the introduction of diseases into a zoo and aquarium collection, and prevent zoonotic disease in both employees and the visiting public. This chapter will review preventive medicine as it applies to keepers that care for a collection of zoo and aquarium animals. Topics will include: goals of preventive medicine; the keeper's role; steps in performing a physical examination on an animal, including dentistry, blood testing, and hoof care; principles and limitations of vaccination; principles of quarantine; biosafety recommendations; interaction between parasites and hosts; comprehensive parasite control programs; correct methods for collecting and storing fecal samples.

48 - Veterinary Diagnostics, Cynthia E. Stringfield
When zoo and aquarium animals become ill, veterinarians often require diagnostic information to make or confirm a diagnosis. Keepers may be best suited to collect a sample or perform a diagnostic procedure due to their relationship with the animal. The keeper's knowledge of the animal, ability to relay information accurately, and ability to obtain diagnostic information from the animal can contribute greatly to achieving an accurate diagnosis and will allow the keeper to actively participate in the health care of the animals. This chapter will provide basic information about diagnostic procedures, emphasizing how keepers can assist with obtaining diagnostic information about the animals they care for. Topics will include: clinical pathology procedures, including blood sampling, cultures, cytology slides, biopsies, urine and other fluid samples, fecal parasitology, and skin scrapings; diagnostic imaging and radiation concerns; endoscopy and exploratory surgery; necropsy.

49 - Medications and Dose Calculations, Mary O'Horo and Tony Beane
Zoo and aquarium keepers must sometimes prepare and administer medications and it is important that they understand the serious nature of their role in handling and delivering such therapeutic agents. The purpose of this chapter is to give keepers an understanding of the process and a background to properly use medications. It is important to note that the actual diagnosing of disease and prescribing of medications is done only by veterinarians. This chapter provides basic information about the use of veterinary medications, pharmacy procedures, and dose calculations. Readers will understand: that drugs are potential poisons and should be used with great care; that the administration of drugs requires strict attention to detail, and prescribed directions must not be altered; that drug labels and package insert contain valuable information; that drugs are available in many forms and have many possible routes of administration; dose intervals and basics of calculating doses.

50 - Chemical Restraint, Mark D. Irwin
The use of drugs to restrain an animal—termed "chemical restraint," "sedation," "anesthesia" or "immobilization"—is frequently needed in zoos and aquariums to provide hands-on access and proper care to the animals. As it requires specialized medical training, it will be conducted by a veterinarian. Keepers will often be asked to assist, and they have an important role. This chapter will focus on situations where the keeper must assist with chemical restraint outside of the animal hospital setting (i.e., "in the field"). The chapter will explain the basic principles, procedures and tools used. Topics include: basic principles of sedation and anesthesia (chemical restraint); the role of keepers during procedures; safety concerns; different methods of inducing chemical restraint; basic procedures for conducting chemical restraint, including planning, preparation, induction, monitoring, and recovery; common equipment.

PART VIII - Education, Outreach and Public Interaction

51 - Educating Entertainingly: Basic Interpretation, D. Andrew Saunders
Keepers and education staff can make a trip to the zoo or aquarium more enjoyable and educational for visitors by applying principles of environmental interpretation. Personal interpretations can be active and interactive, rich with sensory experience and information, incorporated within a theme and supported by three to five subthemes. Keepers can deliver their interpretations to meet personal, professional, and institutional goals, remembering to make provisions for evaluation and improvement; they should never overlook opportunities to connect the animals that brought them into the profession with the visiting public, and to share with zoo visitors the values, opportunities, and responsibilities of stewardship. This chapter will: briefly define and summarize environmental interpretation and educational outreach; provide basic ideas and methods of improving communication with the visiting public; offer suggestions for some of the possible benefits of implementing environmental interpretation approaches in the zoo setting.

52 - Public Relations in Zoos and Aquariums, Jason A. Jacobs
Public relations (PR) are vital to promotion of the mission and work of zoos and aquariums. This chapter will provide

basic information about media and public relations as it affects and is affected by the keeper position. After studying this chapter, the reader will understand: the importance of publicity to the operation of zoos and aquariums; the keeper's role in publicizing zoos and aquariums; the preparation of keepers, animals, and exhibits for media opportunities; methods of addressing proprietary and sensitive information; the development of stories about the zoo and aquarium; the pros and cons of anthropomorphic stories in the media; branding in relation to the keeper's work; keepers' use of the internet and social media.

PART IX - Conservation Science

53 - Conservation Biology, Gerald Dick and Markus Gusset

Conservation biology, a relatively new application of science to conservation problems, addresses the biology of species, communities, and ecosystems that are perturbed, either directly or indirectly, by human activities or other agents (Soulé 1985). Its goal is to provide principles and tools for preserving biological diversity and it can provide an understanding of both threatening and mitigating factors in order to propose solutions for real-world conservation challenges. This chapter will provide zoo and aquarium keepers with an overview of: the definition of biodiversity conservation; global species extinction crises (i.e., amphibian, coral, Asian large mammals) and conservation challenges; global zoo and aquarium conservation strategies (i.e., World Association of Zoos and Aquariums; WAZA); conservation activities of the world's zoos and aquariums.

54 - Research in Zoos, Rebecca E. Spindler and Joanna Wiszniewski

Zoo and aquarium professionals have used research to improve animal health, welfare, husbandry, nutrition, and population management for centuries. A strong foundation of these changes has been the daily interaction between keepers and the animals in their care. With appropriate resources and collaboration, this research can now provide data that is invaluable for predictive models and optimal management of free-ranging animal populations as well as zoo-based wildlife. Further, the application of scientific principles and knowledge to the daily management of captive populations can also lead to continual improvement in zoos. For this to happen efficiently and without duplication of effort, research findings must be published and accessible to people across institutions in all countries. Keepers already play an essential role in research, and each keeper has the potential to apply and expand his or her knowledge through many exciting future research opportunities.

55 - Cooperative Management Programs, Candice Dorsey, Debborah E. Luke and Paul Boyle

Accredited zoos and aquariums serve as conservation centers that are concerned about ecosystem health. They take responsibility for species survival; contribute to scientific research, conservation, and education; and provide society with the opportunity to develop personal connections with the animals in their care. Zoo and aquarium managed populations, often referred to as *ex situ* populations, are usually small compared to their wild or *in situ* counterparts. This chapter will provide an overview of cooperative animal management programs. Readers will understand: the theory and concepts surrounding cooperative regional and global animal management; the roles and responsibilities of the people involved; the history of the Association of Zoos and Aquarium's (AZA's) animal programs; the AZA's emphasis on incorporating long-term population sustainability into animal management administration; the structure and functions of AZA's cooperative Animal Programs (i.e., Species Survival Programs [SSPs]), Scientific Advisory Groups, and committees, and their respective roles within the AZA.

56 - Going "Green" in the Workplace, Beth Posta and Michelle E. S. Parker

For many, being "green" means recycling or turning off lights when leaving a room, whereas for others it means much more, from energy and water conservation to green building. Being green is a culture of three R's: reduce, reuse, and then recycle. People should look to first reduce their consumption of resources and what is used should be reused as much as possible before finally being recycled. This chapter will provide keepers with insight into the many green practices available to today's zoos and aquariums. Readers will have an understanding of: the importance of living sustainably; examples of sustainable practices; types of green energy and the uses of each to limit CO_2 emissions; methods of reducing the negative impact of humans on the planet through daily practices such as cleaning, purchasing, and waste removal; techniques for developing green teams and sustainability practices within zoos and aquariums.

57 - Wildlife Rehabilitation, Erica Miller and Sandra Woltman

Some people say that wildlife rehabilitation has been happening for as long as humans and wild animals have roamed the planet together; many humans feel a need or a responsibility of stewardship to assist injured animals. The concept of wildlife rehabilitation as a specialty separate from other animal care specialties began to grow in the 1960s and 1970s. This chapter provides an introduction to the field of wildlife rehabilitation, particularly as it relates to zoos and aquariums and the participation of keepers. Topics include: an introduction to wildlife rehabilitation; differences from the general care of captive wildlife; methods for keeping wildlife "wild"; permitting and licensing; ethical considerations; the people that rehabilitate wildlife; the roles of zoos, aquariums, and keepers; proper record keeping; behavioral enrichment to wildlife during rehabilitation; the role of non-releasable native wildlife as educational ambassadors; disaster-related wildlife rehabilitation, such as that done after oil spills.

PART X - Government and Legislation

58 - Introduction to Regulation of Zoos and Aquariums, JB.Stoner, MD Irwin and AM Cobaugh

Regulation of zoos and aquariums varies a great deal around the world. This brief chapter is an introduction to later chapters that discuss regional zoo and aquarium regulation. It is impossible to cover all regulations in every region, so some chapters will profile a single country, while others will profile an entire region. Readers of the following chapters will: have a basic understanding of some regional and international legislation; have a broad background in the diversity of zoo and aquarium regulation; be more sympathetic to the constraints placed upon the staff responsible for shipping and receiving animals; understand why time constraints and attention to detail are important for animal transportation, record keeping, licensing, and permitting; appreciate why it is important for zoos and aquariums to be members of national and international associations; comprehend the need for these organizations to be actively involved in the legislative process.

59 - CITES and IATA, Andrea Drost

This chapter will provide zoo and aquarium keepers with an introduction to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the International Air Transport Association (IATA) Live Animals Regulations (LAR). CITES is an international agreement that monitors and regulates the international trade of animals, plants, and their products. Species are

divided into one of three CITES categories based on conservation status: Appendix I, Appendix II, and Appendix III. IATA LAR are the global standard and essential guide to transporting animals by air in a safe, humane, and cost-effective manner (IATA 2010) and have been accepted by CITES as guidelines for animals being shipped by air or land.

60 - Government and Legislation in Africa, D.Morgan
Africa is the world's second largest and second most populous continent, after Asia. It encompasses some 53 nation states and, as a consequence, legislation pertaining to zoo operation within the continent ranges from diverse to nonexistent. However, Africa continues to boast perhaps the world's largest densities of terrestrial free-ranging wild animal populations, and conceivably one of the greatest in diversity. As a result, some degree of wildlife legislation per se exists in most African countries. This chapter will provide an overview of regulations relating to the zoo and aquarium field and some of the activities of the African Association of Zoos and Aquaria (PAAZAB).

61 - Government and Legislation in Asia, S.R. Walker
Asia, with 43 countries and a few protectorates in five regions, is the most diverse of the world's seven continents. Zoo legislation, or even environmental legislation referring to zoos, is diverse where it exists, reflecting Asian countries' widely varied cultures, attitudes, politics, and economies. Asia is the largest continent in both area and population. Zoo legislation is patchy in each region and in most of the countries. Specific standards of zoo exhibition and care are of paramount importance, and are conspicuously absent in nearly all the Asian countries. In Asia, few countries include standards of care, welfare, or display, and none have taxon-specific legislation that details precise values for different animal groups. This chapter will provide an overview of the existing regulations relating to zoos and aquariums of Asia.

62 - Government and Legislation in Australia, Sara F. K. Brice
Legislation provides the framework under which zoos and aquariums in Australia can operate; the resulting regulations influence species selection and the way animals are displayed, transferred between institutions, and collected from the wild. It also determines how animal health and welfare standards are maintained. The Commonwealth of Australia comprises six states and two territories. The diversity of zoo and wildlife parks within Australia includes 39 institutions that are full institutional members of the Zoo Aquarium Association, Australasia (ZAA). There are also at least 100 small wildlife parks that are not ZAA members, most of which display only Australian native species and domesticated animals. This chapter will provide an overview of the regulations relating to zoos and aquariums of Australia.

63 - Government and Legislation in Canada, William A. Rapley
Zoos and aquariums in Canada must adhere to both federal and provincial or territorial regulations. The government of Canada has three main federal offices that have direct impact on Canadian zoos and aquariums: Environment Canada, the Canadian Food Inspection Agency, and the Department of Fisheries and Oceans. Canada is comprised of 10 provinces and 3 territories, each with its own provincial or territorial governmental legislation that zoos and aquariums must be familiar with. Provincial and territorial regulations for Canadian zoos and aquariums vary greatly. This chapter will provide an overview of the regulations relating to zoos and aquariums of Canada.

64 - Government and Legislation in Europe, Lesley Dickie and Miranda Stevenson
Europe comprises the westernmost peninsula of Eurasia, bounded by the Ural Mountains to the east and the Mediterranean Sea to the south, encompassing a total of 50 countries. Zoos within the European Union (EU) and outside its borders are significantly affected both positively and negatively by its legislation. This chapter details a selection of the legislation that impacts animal and wildlife management, and zoo and aquarium operation within the EU. It does not cover laws regarding health and safety, employment, and so on. The most important role for zoos is in making sure that they abide by the existing legislation, but also in making sure their voices are heard as an important stakeholder group. Through activities such as participation in the European Association of Zoos and Aquaria (EAZA), progressive zoos can identify themselves as organizations that can assist the EU in formulating legislation that works in practice. This chapter will provide an overview of the regulations relating to zoos and aquariums of the EU.

65 - Government and Legislation in New Zealand, Tineke Joustra
The earliest attempt at wildlife legislation in New Zealand was in 1864, when some protection was given to native species with the declaration of a closed season for native ducks and pigeons. It was not until the late 19th century that the belief that native birds and plants would inevitably disappear due to introduced species was recognized. Legislation in New Zealand affects zoo and aquarium operation in many ways such as the restriction of animal importation, requirements for record keeping, reporting, and animal identification; lengthy wait periods for permitting; and specific regulation of the transport and quarantine of animals. This chapter will provide an overview of the regulations relating to zoos and aquariums of New Zealand.

66 - Government and Legislation in the United States, Steve Olson
It is important for zoo and aquarium professionals to be knowledgeable about the legislative and regulatory activities around them—to be familiar with the government actions that could impact their work environment and their day-to-day activities. It is essential for persons involved in the capture, shipment, receipt, sale, transportation, or display of wildlife to be familiar with existing local, state, national, and international wildlife laws. Ignorance of the laws and assumptions of compliance will not withstand legal challenge. This chapter will overview: the United States' legislative and regulatory system, including the role of the US Department of Agriculture's Animal and Plant Health Inspection Service and the US Fish and Wildlife Service; key US laws and regulations (e.g., the Animal Welfare Act, the Endangered Species Act, and the Lacey Act); and how these regulatory measures directly impact directors, curators, and keepers alike.

Additional useful features for Zookeepers, zoo veterinarians, zoo curators, zoo directors, zoo educators, etc: Acknowledgements of authors & contact information, Appendices : Readings, Web Links, List of Collleges and Universities, Glossary, Contributors Index

See you next month! - Editor