

# AUSTRALIAN MAMMALS

## BIOLOGY AND CAPTIVE MANAGEMENT



Stephen Jackson

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# FOREWORD

As someone who has had more than twelve years experience within the zoo profession, it is with great pleasure that I pen these few words as a foreword to this excellent publication. As it says in the Introduction, there have been many previous books and publications on the subject of managing Australian animals in captivity. It is my belief that this current publication will prove to be a landmark publication and the reference for all those interested in maintaining animals in captivity. It matters not whether you are a zoo professional, research institution, wildlife carer, National Parks personnel or an enthusiastic amateur – this book is for you.

The book itself gives a most useful brief account of the historic record of each group in captivity before moving on to cover subjects including husbandry, diet, captive breeding, conservation status, milk supplements and replacements and recommendations for display and behavioural enrichment.

As I perused the various chapters, I was struck by the speed with which our knowledge of these animals is increasing and the need to centralise it in one publication. I was also struck by the fact that we have come a long way since Captain Nicolas Baudin, on his way back to Europe in 1803, fed his kangaroos wine and sugar, while the emus were force fed with pellets of rice mash and his officers gave up their cabins to accommodate the animals. The fact that so many survived this long voyage says more about the hardiness of the animals than the dietary knowledge of their carers.

Since the first specimens were taken back to Europe at the end of the 18th century, Australian animals, owing to their uniqueness, have held a fascination for people throughout the world. That the fascination has not abated, but indeed increased, is evidenced by the number of institutions throughout the world which are displaying a number of species and those which are asking to be allowed to display some of our unique fauna.

The original reasons for taking animals to the northern hemisphere was certainly to demonstrate our dominion over nature and to show these ‘curiosities’ to the public. Today, while curiosity and fascination still play a part in the desire to display Australian animals, more and more often the animals are being used for conservation education reasons and, on occasions, captive breeding.

It is unfortunate that Australia has had an unenviable record in species extinction during our first 150 years of settlement. It behoves us to maintain what we have left and to increase the numbers existing, both in the field and by captive management, of a number of species. Success is best achieved by increasing our knowledge of our fauna and undertaking public education programs. I am, of course, committed to the roles which zoos and like institutions can play in ensuring that conservation breeding, research and conservation education programs are undertaken.

This book contains the work and knowledge of a large number of experts and professionals, many of whom I have come to know personally over the years. I believe that it will become a ‘must have’ volume on the library shelves of people seriously interested in the future of Australian mammals.

I commend Stephen Jackson, CSIRO Publishing and all those involved in this excellent undertaking and I commend the book to you, the reader.

Ed McAlister AO  
*President*  
World Association of Zoos and Aquariums  
Adelaide  
November 2003

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# INTRODUCTION

Australian mammals have been held in captivity in Australia and throughout the world for over 200 years. Although originally kept as sources of curiosity, entertainment and novelty, today they are increasingly held to educate the public about their biology and threatened status, as part of captive breeding programs, for hand-rearing following the death of their mothers, for rehabilitation after injury or illness, for research and as pets.

Captive facilities need to optimize conditions for the animals by allowing them to feel secure, providing high quality food, allowing them to undertake a large range of natural solitary and social behaviours, allowing them to be easily observed for husbandry and education purposes and allowing the animals to be caught with minimum stress. The husbandry of Australia's mammals in captivity is an expanding field, with earlier literature based largely on first-hand experiences of enclosure sizes, captive diet, behaviour and breeding. While this information is highly valuable, there has been a need to bring together aspects of the biology (including wild diet, social behaviour, reproduction and nesting requirements) to maximize appropriate conditions for these species in captivity. Publications such as the landmark *Monotremes and Marsupials* (Collins 1973), *The Management of Australian Mammals in Captivity* (Evans 1982) and more recently the *Care and Handling of Australian Native Animals* (Hand 1990) have made great advances in our knowledge of the husbandry of Australian mammals, though they do not include all mammalian taxonomic groups nor attempt to match the general principles of husbandry with their wild biology and, with the exception of Collins (1973), nor do they have a standardized outline for information coverage.

The aim of this book is to provide detailed information on the biology and husbandry of all Australia's native terrestrial mammals. It is hoped that zookeepers, students, researchers, veterinarians, wildlife carers and the ever-expanding group of private individuals that keep Australian mammals as pets will find the information on general biology, captive management, behaviour, breeding, the extensive reference list and bibliography, useful. Although primarily focused on the management of Australian mammals in captivity, various aspects are of use to field biologists including capture and restraint techniques, aging techniques and behaviour and breeding information. It is also hoped that this volume will stimulate further improvement in the standard of husbandry of Australian mammals.

Despite attempts to incorporate as much published and unpublished information as possible in this book, there are clearly numerous gaps in our knowledge that need to be filled. Areas of future development include fine-tuning diets, enclosure designs, area requirements, capture and restraint techniques, behavioral enrichment methods and population management techniques. The availability of animals within captive facilities also allows the opportunity to undertake significant research including studies on taxonomy, aging techniques, digestive physiology, social and reproductive behaviour, reproductive physiology such as oestrous cycles and gestation periods, artificial reproductive techniques, milk composition and growth and development. With this in mind, this book is seen as the consolidation of information for the start of a journey rather than an end, and so readers are encouraged to further explore and record their knowledge of the captive management of Australian mammals.

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# ACKNOWLEDGMENTS

Clearly a work of this scope cannot be created in isolation, and the help and assistance of numerous people in various institutions throughout Australia and overseas has been extensively utilized. In undertaking this project I have endeavoured to include the extraordinary knowledge that exists within the zoo industry and by numerous field biologists, by asking many people to read and make comments on various draft chapters or sections of chapters in order to improve them further. This information has proved invaluable in making this work of greater quality and giving a broader perspective than a particular institution and therefore is more widely useful. Although I have been responsible for putting the book together, the end product is a testament to the abundant skills and experience, generously shared, by people within the zoo industry and numerous biologists.

In particular I would like to thank those who co-authored or authored several of the chapters including Dr Melody Serena, Dr David Middleton, Vicki Power, Dr Cree Monaghan, Dr Katie Reid, Des Spittal and Liz Romer. Sincere thanks to Lindell Andrews, Wendy Gleen, Annette Gifford and Geoff Underwood for reviewing many of the chapters. I am very grateful to Annette Gifford, Jo Cowey and Louise Baume who reviewed the sections on artificial rearing and made numerous valuable suggestions. Professor Peter Temple-Smith and Dr David Taggart reviewed the sections on reproduction and several other chapters, which was greatly appreciated. Dr Michael Messer made

numerous valuable comments on the content of milk of the various taxonomic groups and the use of various milk formulas. An enormous thankyou goes to the various veterinarians who read over the health requirements section of each chapter and made various suggestions to ensure the health information was accurate, including Dr Terri Bellamy, Dr David Blyde, Dr Rosie Booth, Dr Cree Monaghan, Dr Lee Skerratt and Dr Rupert Woods. Dr Ian Lugdon also read over all the health sections and made numerous valuable comments.

Many thanks to the staff at Taronga Zoo who read over various drafts of most chapters and allowed me to take photos from which most of the handling drawings were completed. The staff of the Zoological Parks and Gardens Board of Victoria, including Michael de Oliveira, Professor Peter Temple-Smith and Gary Slater provided valuable support for this project. I am also grateful for the assistance of Megan Temple who photocopied a number of the references.

Acknowledgments for individuals who helped in the different chapters can be found at the end of each chapter. Thanks also to those who helped review the whole document including William Meikle and Matthew Crane. Many thanks also to Nick Alexander and Briana Elwood from CSIRO Publishing for all their hard work and patience in putting this work together. Finally many thanks also to my parents and Kerstin McPherson for her patience and encouragement in writing this and for her assistance in finding many references.

# OUTLINE

Each chapter covers a separate taxonomic group of Australian mammals and an effort has been made to make the scope of information covered as uniform as possible by using the husbandry manual outline described in Jackson (2003). The common names and

taxonomy used in this book follows Strahan (1995) except where stated. The references for each chapter are found in the reference section at the end of the book with additional references that may be useful being found in the bibliography.