

Marine Mammals Evolutionary Biology

“A palaeontological howdunnit...[Spying on Whales] captures the excitement of...seeking answers to deep questions in cetacean science.” —Nature Called “the best of science writing” (Edward O. Wilson) and named a best book by Popular Science, a dive into the secret lives of whales, from their four-legged past to their perilous present. Whales are among the largest, most intelligent, deepest diving species to have ever lived on our planet. They evolved from land-roaming, dog-sized creatures into animals that move like fish, breathe like us, can grow to 300,000 pounds, live 200 years and travel entire ocean basins. Whales fill us with terror, awe, and affection--yet there is still so much we don't know about them. Why did it take whales over 50 million years to evolve to such big sizes, and how do they eat enough to stay that big? How did their ancestors return from land to the sea--and what can their lives tell us about evolution as a whole? Importantly, in the sweepstakes of human-driven habitat and climate change, will whales survive? Nick Pyenson's research has given us the answers to some of our biggest questions about whales. He takes us deep inside the Smithsonian's unparalleled fossil collections, to frigid Antarctic waters, and to the arid desert in Chile, where scientists race against time to document the largest fossil whale site ever found. Full of rich storytelling and scientific discovery, Spying on Whales spans the ancient past to an uncertain future--all to better understand the most enigmatic creatures on Earth.

Interest in marine mammals has increased dramatically in the last few decades, as evidenced by the number of books, scientific papers, and conferences devoted to these animals. Nowadays, a conference on marine mammals can attract between one and two thousand scientists from around the world. This upsurge of interest has resulted in a body of knowledge which, in many cases, has identified major conservation problems facing particular species. At the same time, this knowledge and the associated activities of environmental organisations have served to introduce marine mammals to a receptive public, to the extent that they are now perceived by many as the living icons of biodiversity conservation. Much of the impetus for the current interest in marine mammal conservation comes from "Save the Whale" campaigns started in the 1960s by environmental groups around the world, in response to declining whale populations after over-exploitation by humans. This public pressure led to an international moratorium on whaling recommended in 1972 by the United Nations Conference on the Human Environment in Stockholm, Sweden, and eventually adopted by the International Whaling Commission ten years later. This moratorium largely holds sway to this day, and further protective measures have included the delimitation of extensive areas of the Indian Ocean (1979) and Southern Ocean (1994) as whale sanctuaries.

This book is a succinct yet comprehensive text devoted to the systematics, evolution, morphology, ecology, physiology and behaviour of marine mammals.

Much of our knowledge about marine mammals is derived from a long-term and dedicated research effort that is evolving rapidly due to the introduction and invention of new methods. This book reflects the inventiveness of marine researchers as they try to find

ways around the problems presented to them by these unusual and challenging animals.

This book provides students and researchers with reviews of biological questions related to the evolution of feeding by vertebrates in aquatic and terrestrial environments. Based on recent technical developments and novel conceptual approaches, the book covers functional questions on trophic behavior in nearly all vertebrate groups including jawless fishes. The book describes mechanisms and theories for understanding the relationships between feeding structure and feeding behavior. Finally, the book demonstrates the importance of adopting an integrative approach to the trophic system in order to understand evolutionary mechanisms across the biodiversity of vertebrates.

Attention has been drawn to the subject of how ocean noise affects marine mammals by a series of marine mammal strandings, lawsuits, and legislative hearings, and most recently, the report from the U.S. Commission on Ocean Policy. One way to assess the impact of ocean noise is to consider whether it causes changes in animal behavior that are "biologically significant," that is, those that affect an animal's ability to grow, survive, and reproduce. This report offers a conceptual model designed to clarify which marine mammal behaviors are biologically significant for conservation purposes. The report is intended to help scientists and policymakers interpret provisions of the federal Marine Mammal Protection Act.

Berta and Sumich have succeeded yet again in creating superior marine reading! This book is a succinct yet comprehensive text devoted to the systematics, evolution, morphology, ecology, physiology, and behavior of marine mammals. The first edition, considered the leading text in the field, is required reading for all marine biologists concerned with marine mammals. Revisions include updates of citations, expansion of nearly every chapter and full color photographs. This title continues the tradition by fully expanding and updating nearly all chapters. Comprehensive, up-to-date coverage of the biology of all marine mammals Provides a phylogenetic framework that integrates phylogeny with behavior and ecology Features chapter summaries, further readings, an appendix, glossary and an extensive bibliography Exciting new color photographs and additional distribution maps Presents full-color photographs and illustrations of a wide variety of whales, dolphins, and other marine mammals around the world; and contains information on their habitats, physical characteristics, and behaviors.

Humans are mammals. Most of us appreciate that at some level. But what does it mean for us to have more in common with a horse and an elephant than we do with a parrot, snake or frog? After a misdirected football left new father Liam Drew clutching a uniquely mammalian part of his anatomy, he decided to find out more. Considering himself as a mammal first and a human second, Liam delves into ancient biological history to understand what it means to be mammalian. In his humorous and engaging style, Liam explores the different characteristics that distinguish mammals from other types of animals. He charts the evolution of milk, warm blood and burgeoning brains, and examines the emergence of sophisticated teeth, exquisite ears, and elaborate reproductive biology, plus a host of other mammalian innovations. Entwined are tales of zoological peculiarities and reflections on how being a mammal has shaped the

author's life. I, Mammal is a history of mammals and their ancestors and of how science came to grasp mammalian evolution. And in celebrating our mammalian-ness, Liam Drew binds us a little more tightly to the five and a half thousand other species of mammal on this planet and reveals the deep roots of many traits humans hold dear.

The charismatic mammals that live in the ocean are a constant source of interest, both for scientists and our society at large. Their biology, behavior, and conservation are of utmost importance, as a vast number of species are currently threatened. Intended for the upper-level undergraduate or graduate student within biology, marine biology, or conservation/environmental science, *An Introduction to Marine Mammal Biology and Conservation* provides a broad introduction to marine mammal biology using cutting edge information and student-friendly learning tools. The text begins with chapters on the evolution and classification of marine mammals and their general biology. It moves on to discuss the behavior and ecology of different groups of marine mammals, such as polar bears, otters, and cetaceans. Part 3 dives into many different conservation issues facing marine mammals, as well as discussions on how they can be addressed. Closing chapters provide information on how scientists study marine mammals, how society can enjoy observing the animals while making sure they are preserved, and a word to students looking to pursue a career with marine mammals.

Marine Mammals Evolutionary Biology Elsevier

This thorough revision of the classic *Encyclopedia of Marine Mammals* brings this authoritative book right up-to-date. Articles describe every species in detail, based on the very latest taxonomy, and a host of biological, ecological and sociological aspects relating to marine mammals. The latest information on the biology, ecology, anatomy, behavior and interactions with man is provided by a cast of expert authors – all presented in such detail and clarity to support both marine mammal specialists and the serious naturalist. Fully referenced throughout and with a fresh selection of the best color photographs available, the long-awaited second edition remains at the forefront as the go-to reference on marine mammals. More than 20% NEW MATERIAL includes articles on Climate Change, Pacific White-sided Dolphins, Sociobiology, Habitat Use, Feeding Morphology and more Over 260 articles on the individual species with topics ranging from anatomy and behavior, to conservation, exploitation and the impact of global climate change on marine mammals New color illustrations show every species and document topical articles FROM THE FIRST EDITION "This book is so good...a bargain, full of riches...packed with fascinating up to date information. I recommend it unreservedly it to individuals, students, and researchers, as well as libraries." --Richard M. Laws, *MARINE MAMMALS SCIENCE* "...establishes a solid and satisfying foundation for current study and future exploration" --Ronald J. Shusterman, *SCIENCE*

To develop a science of hearing that is intellectu The five-day conference was held at the Mote ally satisfying we must

first integrate the diverse, Marine Laboratory in Sarasota, Florida, May - extensive body of comparative research into an 24, 1990. The invited participants came from the evolutionary context. The need for this integra fields of comparative anatomy, physiology, biophys tion, and a conceptual framework in which it could ics, animal behavior, psychophysics, evolutionary be structured, were demonstrated in landmark biology, ontogeny, and paleontology. Before the papers by van Bergeijk in 1967 and Wever in 1974. conference, preliminary manuscripts of the invited However, not since 1965, when the American papers were distributed to all participants. This facilitated - even encouraged - discussions through Society of Zoologists sponsored an evolutionary conference entitled "The Vertebrate Ear;" has there out the conference which could be called, among other things, "lively. " The preview of papers, along been a group effort to assemble and organize our current knowledge on the evolutionary-as with the free exchange of information and opinion, opposed to comparative-biology of hearing. also helped improve the quality and consistency of In the quarter century since that conference the final manuscripts included in this volume. there have been major changes in evolutionary In addition to the invited papers, several studies concepts (e. g. , punctuated equilibrium), in sys were presented as posters during evening sessions.

Members of the mammalian clade Carnivora have invaded nearly every continent and ocean, evolving into bamboo-eating pandas, clam-eating walruses and of course, flesh-eating sabre-toothed cats. With this ecological, morphological and taxonomic diversity and a fossil record spanning over sixty million years, Carnivora has proven to be a model clade for addressing questions of broad evolutionary significance. This volume brings together top international scientists with contributions that focus on current advances in our understanding of carnivoran relationships, ecomorphology and macroevolutionary patterns. Topics range from the palaeoecology of the earliest fossil carnivorans to the influences of competition and constraint on diversity and biogeographic distributions. Several studies address ecomorphological convergences among carnivorans and other mammals with morphometric and Finite Element analyses, while others consider how new molecular and palaeontological data have changed our understanding of carnivoran phylogeny. Combined, these studies also illustrate the diverse suite of approaches and questions in evolutionary biology and palaeontology.

Marine Mammal Ecotoxicology: Impacts of Multiple Stressors on Population Health provides tactics on how to develop a comprehensive methodology for the study of existing threats to marine mammals. By presenting a conservation-biology approach and new and emerging technologies, this work helps provide crucial knowledge on the status of marine mammal populations that not only helps readers understand the ecosystem's health, but also instigate mitigation measures. This volume provides information that helps investigators unravel the relationships between exposure to

environmental stressors (e.g., climate change, pollutants, marine litter, pathogens and biotoxins) and a range of endpoints in marine mammal species. The application of robust examination procedures and biochemical, immunological, and molecular techniques, combined with pathological examination and feeding ecology, has led to the development of health assessment methods at the individual and population levels in wild marine mammals. Provides a comprehensive, worldwide update and state of knowledge on current research and topics on marine mammal ecotoxicology Includes coverage of both new and emerging technologies Features a multidisciplinary approach that gives readers a broad, updated overview of the threats facing marine mammals and related conservation measures

The eighty-nine cetacean species that swim our seas and rivers are as diverse as they are intelligent and elusive, from the hundred-foot-long, two-hundred-ton blue whale to the lesser-known tucuxi, ginkgo-toothed beaked whale, and diminutive, critically endangered vaquita. The huge distances these highly migratory creatures cover and the depths they dive mean we catch only the merest glimpses of their lives as they break the surface of the water. But thanks to the marriage of science and technology, we are now beginning to understand their anatomy, complex social structures, extraordinary communication abilities, and behavioral patterns. In this beautifully illustrated guide, renowned marine mammalogist Annalisa Berta draws on the contributions of a pod of fellow whale biologists to present the most comprehensive, authoritative overview ever published of these remarkable aquatic mammals. Opening with an accessible rundown of cetacean biology—including the most recent science on feeding, mating, and communication—Whales, Dolphins, and Porpoises then presents species-specific natural history on a range of topics, from anatomy and diet to distribution and conservation status. Each entry also includes original drawings of the species and its key identifiers, such as fin shape and color, tooth shape, and characteristic markings as they would appear both above and below water—a feature unique to this book. Figures of myth and—as the debate over hunting rages on—figures of conflict since long before the days of Moby-Dick, whales, dolphins, and porpoises are also ecologically important and, in many cases, threatened. Written for general enthusiasts, emergent cetacean fans, and biologists alike, this stunning, urgently needed book will serve as the definitive guide for years to come.

The Anatomy of Dolphins: Insights into Body Structure and Function is a precise, detailed, fully illustrated, descriptive, and functionally oriented text on the anatomy and morphology of dolphins. It focuses on a number of delphinid species, with keynotes on important dolphin-like genera, such as the harbor porpoise. It also serves as a useful complement for expanding trends and emphases in molecular biology and genetics. The authors share their life-long expertise on marine mammals in various disciplines. Written as a team rather than being prepared as a collection of separate contributions, the result is a uniform and comprehensive style, giving each of the different topics appropriate space. Many color figures,

which use the authors' access to wide collections of unique dolphin and whale material, round out this exceptional offering to the field. Includes high-quality illustrations, drawings, halftone artwork, photographic documentations, microphotos, and tables detailing dolphin anatomy, function, and morphology Facilitates education and training of students of all basic research and applied sciences dedicated to marine biology and the medical care of marine mammals Brings together the current knowledge and information on this topic, including those in obscure past or non-English publications, or scattered in short chapters in volumes Covers a number of delphinid species and serves as a useful complement for expanding trends in molecular biology and genetics

Mammalogists, paleontologists, and marine scientists will find Berta's insights absorbing, while developmental and molecular biologists, geneticists, and ecologists exploring integrative research approaches will benefit from her fresh perspective.

Taking an integrated approach to the biology of marine carnivores, cetaceans, and sirenians, twenty-two prominent researchers compare marine mammals with one another and with terrestrial mammals, providing a framework for fundamental biological and ecological concepts. They describe functional morphology, sensory systems, energetics, reproduction, communication and cognition, behavior, distribution, population biology, and feeding ecology. They also detail the physiological adaptations—for such activities and processes as diving, thermo-regulation, osmoregulation, and orientation—that enable marine mammals to exploit their aquatic environment.

Marine Mammal Biology: An Evolutionary Approach considers various aspects of Marine Mammal Biology including an extensive historical overview of Marine Mammal Biology and related issues. It includes definitions of understanding the elements of Marine Evolution and introduction to the evolution of Marine Mammals. Provides the reader with insights into the development of its history, so as to understand the Marine Mammal Biology and other marine mammals in detail to understand the concept from a broader perspective.

This book is designed as a source and reference for people interested in the history and fossil record of North American tertiary mammals. Each chapter covers a different family or order, and includes information on anatomical features, systematics, the distribution of the genera and species at different fossil localities, and a discussion of their paleobiology. Many of these groups have never been covered in this fashion before.

Her analysis takes readers to the haunts of intriguing semi-aquatic mammals from around the world,; introducing the "paradoxical platypus,an Australian egg-laying monotreme that detects prey through electroreception; venturing into the swamps and mangroves of Southeast Asia, where fishing cats wave their paws above the water's surface to lure prey; trawling the streams and lakes of South America, where the female water opossum uses its backward-facing pouch to

keep her babies warm during deep dives; spending time with species that engineer freshwater habitats into more productive and complex systems, including North American beavers and Africa's common hippopotamus. Featuring award-winning artist Meaghan Brierley's stunning illustrations throughout, *Semi-aquatic Mammals* is an unparalleled reference on some of the world's most tenacious and fascinating mammals.

Return to the Sea portrays the life and evolutionary times of marine mammals--from giant whales and sea cows that originated 55 million years ago to the deep-diving elephant seals and clam-eating walruses of modern times. This fascinating account of the origin of various marine-mammal lineages--some extinct, others extant but threatened--is for the nonspecialist. Against a backdrop of geologic time and changing climates and geography, this volume takes evolution as its unifying principle to help us to understand today's diversity of marine mammals and their responses to environmental challenges. Annalisa Berta explains current controversies and explores patterns of change now taking place, such as shifting food webs and predator-prey relationships, habitat degradation, global warming, and the effects of humans on marine-mammal communities.

Marine mammals attract human interest – sometimes this interest is benign or positive – whale watching, conservation programmes for whales, seals, otters, and efforts to clear beaches of marine debris are seen as proactive steps to support these animals. However, there are many forces operating to affect adversely the lives of whales, seals, manatees, otters and polar bears – and this book explores how the welfare of marine mammals has been affected and how they have adapted, moved, responded and sometimes suffered as a result of the changing marine and human world around them. *Marine mammal welfare* addresses the welfare effects of marine debris, of human traffic in the oceans, of noise, of hunting, of whale watching and tourism, and of some of the less obvious impacts on marine mammals – on their social structures, on their behaviours and migration, and also of the effects on captivity for animals kept in zoos and aquaria. There is much to think and talk about – how marine mammals respond in a world dramatically influenced by man, how are their social structures affected and how is their welfare impacted?

Cetaceans (whales, dolphins, and porpoises) have fascinated and bewildered humans throughout history. Their mammalian affinities have been long recognized, but exactly which group of terrestrial mammals they descend from has, until recently, remained in the dark. Recent decades have produced a flurry of new fossil cetaceans, extending their fossil history to over 50 million years ago. Along with new insights from genetics and developmental studies, these discoveries have helped to clarify the place of cetaceans among mammals, and enriched our understanding of their unique adaptations for feeding, locomotion and sensory systems. Their continuously improving fossil record and successive transformation into highly specialized marine mammals have made cetaceans a textbook case of evolution - as iconic in

its own way as the origin of birds from dinosaurs. This book aims to summarize our current understanding of cetacean evolution for the serious student and interested amateur using photographs, drawings, charts and illustrations. A human female is born, lives her life, and dies within the space of a few decades, but the shape of her life has been strongly influenced by 50 million years of primate evolution and more than 100 million years of mammalian evolution. How the individual female plays out the stages of her life--from infancy, through the reproductive period, to old age--and how these stages have been formed by a long evolutionary process, is the theme of this collection. Written by leading scholars in fields ranging from evolutionary biology to cultural anthropology, these essays together examine what it means to be female, integrating the life histories of marine mammals, monkeys, apes, and humans. The result is a fascinating inquiry into the similarities among the ways females of different species balance the need for survival with their role in reproduction and mothering. The *Evolving Female* offers an outlook integrating life history with an intimate examination of female life paths. Behavior, anatomy and physiology, growth and development, cultural identity of women, the individual, and the society are among the topics investigated. In addition to the editors, the contributors are Linda Fedigan, Kathryn Ono, Joanne Reiter, Barbara Smuts, Mariko Hiraiwa-Hasegawa, Mary McDonald Pavelka, Caroline Pond, Robin McFarland, Silvana Borgognini Tarli and Elena Repetto, Gilda Morelli, Patricia Draper, Catherine Panter-Brick, Virginia J. Vitzthum, Alison Jolly, and Beverly McLeod.

As the first four-legged vertebrates, called tetrapods, crept up along the shores of ancient primordial seas, feeding was among the most paramount of their concerns. Looking back into the mists of evolutionary time, fish-like ancestors can be seen transformed by natural selection and other evolutionary pressures into animals with feeding habitats as varied as an anteater and a whale. From frog to pheasant and salamander to snake, every lineage of tetrapods has evolved unique feeding anatomy and behavior. Similarities in widely divergent tetrapods vividly illustrate their shared common ancestry. At the same time, numerous differences between and among tetrapods document the power and majesty that comprises organismal evolutionary history. Feeding is a detailed survey of the varied ways that land vertebrates acquire food. The functional anatomy and the control of complex and dynamic structural components are recurrent themes of this volume. Luminaries in the discipline of feeding biology have joined forces to create a book certain to stimulate future studies of animal anatomy and behavior.

Hans Thewissen, a leading researcher in the field of whale paleontology and anatomy, gives a sweeping first-person account of the discoveries that brought to light the early fossil record of whales. As evidenced in the record, whales evolved from herbivorous forest-dwelling ancestors that resembled tiny deer to carnivorous monsters stalking lakes and rivers and to serpentlike denizens of the coast. Thewissen reports on his discoveries in the wilds of India and Pakistan,

weaving a narrative that reveals the day-to-day adventures of fossil collection, enriching it with local flavors from South Asian culture and society. The reader senses the excitement of the digs as well as the rigors faced by scientific researchers, for whom each new insight gives rise to even more questions, and for whom at times the logistics of just staying alive may trump all science. In his search for an understanding of how modern whales live their lives, Thewissen also journeys to Japan and Alaska to study whales and wild dolphins. He finds answers to his questions about fossils by studying the anatomy of otters and porpoises and examining whale embryos under the microscope. In the book's final chapter, Thewissen argues for approaching whale evolution with the most powerful tools we have and for combining all the fields of science in pursuit of knowledge.

Marine mammals (MMs) are regarded as valuable bioindicators with tremendous potential for public health. However, many aspects of their immune system remain poorly understood. Monitoring immune responses of MMs is pivotal for the health assessment of both individuals and populations, as well as providing the scientific basis for analyzing the anthropogenic environmental impact on marine ecosystems and marine-terrestrial interphases. For instance, the increasing susceptibility of Mediterranean whale and dolphin populations to various diseases has been linked to a possible negative influence of multiple environmental factors on the immune system of MMs. The currently limited knowledge on MM immunology has mainly centered on: (i) lymphocyte transformation assays; (ii) natural killer cell activity; (iii) phagocytic activity and respiratory burst; (iv) humoral immune responses; (v) cytokines and (vi) acute phase immune responses. Therefore, further research is essential for deepening our understanding of the specificity of the host immune response in MMs, with a particular emphasis on the genesis and dynamics of (i) cytokine 'networks' or 'signatures'; (ii) transcriptional regulation of immune cells and (iii) major immunomodulators. High-throughput molecular techniques, such as transcriptomic analysis and RNA sequencing, may enable the characterization of immune gene responses at the transcriptomic level. This integrative and holistic approach requires sophisticated tools and methods capable of unveiling the diversity of immune cells and immunologically relevant molecules that orchestrate environmental adaptation and immune protection against pathogens in MMs. This Research Topic aims to provide a comprehensive overview of the current knowledge of MM immunology with a particular emphasis on structural and functional studies at the protein and cellular level. We wish to encourage and coordinate studies and investigations in order to fill gaps of knowledge in this field. This article collection aims to help gain more data regarding: a) The characterization of the immune system in several species of MMs, i.e. cetaceans, pinnipeds and sirenians; b) The interplay between the host immune system and the most relevant pathogens, e.g., Morbillivirus, Brucella, Toxoplasma gondii and c) The possible interplay between the immune system and contaminants.

CRC Handbook of Marine Mammal Medicine, Second Edition is the only handbook specifically devoted to marine mammal medicine and health. With 66 contributors working together to craft 45 scientifically-based chapters, the text has been completely revised and updated to contain all the latest developments in this field. Building upon the solid foundation of the previous edition, the contents of this book are light-years ahead of the topics presented in the first edition. See what's new in the Second Edition: Marine mammals as sentinels of ocean health Emerging and resurging diseases Thorough revision of the Immunology chapter Diagnostic imaging chapters to illustrate new techniques Quick reference for venipuncture sites in many marine mammals Unusual mortality events and mass strandings New topics such as a chapter on careers Wider scope of coverage including species outside of the United States and Canada Filled with captivating illustrations and photographs, the Handbook guides you through the natural history of cetaceans, pinnipeds, manatees, sea otters, and polar bears. Prepared in a convenient, easy-to-use format, it is designed specifically for use in the field. Covering more than 40 topics, this one-of-a-kind reference is packed with data. The comprehensive compilation of information includes medicine, surgery, pathology, physiology, husbandry, feeding and housing, with special attention to strandings and rehabilitation. The CRC Handbook of Marine Mammal Medicine, Second Edition is still a must for anyone interested in marine mammals.

With coverage on all the marine mammals of the world, authors Jefferson, Webber, and Pitman have created a user-friendly guide to identify marine mammals alive in nature (at sea or on the beach), dead specimens “in hand , and also to identify marine mammals based on features of the skull. This handy guide provides marine biologists and interested lay people with detailed descriptions of diagnostic features, illustrations of external appearance, beautiful photographs, dichotomous keys, and more. Full color illustrations and vivid photographs of every living marine mammal species are incorporated, as well as comprehensible maps showing a range of information. For readers who desire further consultation, authors have included a list of literature references at the end of each species account. For an enhanced understanding of habitation, this guide also includes recognizable geographic forms described separately with colorful paintings and photographs. All of these essential tools provided make Marine Mammals of the World the most detailed and authoritative guide available! * Contains superb photographs of every species of marine mammal for accurate identification * Authors’ collective experience adds up to 80 years, and have seen nearly all of the species and distinctive geographic forms described in the guide * Provides the most detailed and anatomically accurate illustrations currently available * Special emphasis is placed on the identification of species in “problem groups, such as the beaked whales, long-beaked oceanic dolphin, and southern fur seals * Includes a detailed list of sources for more information at the back of the book.

This book is unlike any other work on primates: it systematically reviews the biology of all living primates, including humans. It describes their bio-geographical information and provides crucial data pertaining to their body size, fur coloration external distinguishing features, habitat and basic life strategies. Now in its third edition, *Primate Anatomy* discusses species that are new to science since the last edition with details concerning anatomical features among primates that were re-discovered. New research in molecular primatology is also included due to recent relevant findings in molecular biology in accordance with new technology. The basics of biological taxonomy are introduced, along with photographs of all major groups. Important new and controversial issues make this edition key for every primatologist, anthropologist, and anatomist. Offers up-to-date reviews of molecular primatology and primate genomics Concentrates on living primates and their overall biology Discusses the genetic connection of function where known Introduces primate genomics for the first time in a textbook Provides instructive and comprehensive review tables Includes many unique, novel and easily understandable illustrations

Suppose you were designing a marine mammal. What would you need to think about to allow it to live in the ocean? How would you keep it warm? What would you design to allow it to dive for very long periods to extreme depths? Where would it find water to drink? How would you minimize the cost of swimming, and how would it find its prey in the deep and dark? These questions and more are examined in detail throughout this book. *Marine Mammal Physiology: Requisites for Ocean Living* is the first textbook focused on how marine mammals live in the sea from a physiological point of view. It explores the essential aspects of what makes a marine mammal different from terrestrial mammals, beyond just their environment. Unlike many publications and books that cover these species from almost all perspectives, this textbook takes a step back to focus on the physiological and biochemical characteristics that have allowed these mammals as a group to exploit effectively the marine environment that is so hostile to humans. The chapter topics are grouped into major themes: diving and locomotion, nutrition and energetics, reproduction, sensory systems, and environmental interactions. Each chapter is arranged around a common perspective and theme: the big picture challenge and summary and what is known specifically by order. To aid you even further, the authors include a "Toolbox" section in each chapter where they discuss the newest methods for understanding and working on the physiology of marine mammals.

Ranging from crocodiles and penguins to seals and whales, this synthesis explores the function and evolution of sensory systems in animals whose ancestors lived on land. It explores the dramatic transformation of smell, taste, sight, hearing, and balance that occurred as lineages of reptiles, birds, and mammals returned to aquatic environments.

Setting the stage : rocks, fossils and evolution -- The oldest marine mammals : whales and sea cows -- Later diverging whales : Neoceti -- Aquatic carnivores : pinnipeds and a bear-like carnivoran -- Crown sirenians and their desmostylian relatives -- Aquatic sloths and recent occupants of the sea-sea otters and polar bears -- Diversity changes through time : the influence of climate change and humans

This book provides a general introduction to the biology of marine mammals, and an overview of the adaptations that have permitted mammals to succeed in the marine environment. Each chapter, written by experts in their field, will provide an up-to-date review and present the major discoveries and innovations in the field. Important technical advances such as satellite telemetry and time-depth-recorders will be

described in boxes.

Introduction to the Biology of Marine Life is an introductory higher education textbook for students with no prior knowledge of marine biology. The book uses selected groups of marine organisms to provide a basic understanding of biological principles and processes that are fundamental to sea life.

The Evolutionary Biology of Extinct and Extant Organisms offers a thorough and detailed narration of the journey of biological evolution and its major transitional links to the biological world, which began with paleontological exploration of extinct organisms and now carries on with reviews of phylogenomic footprint reviews of extant, living fossils. This book moves through the defining evolutionary stepping stones starting with the evolutionary changes in prokaryotic, aquatic organisms over 4 billion years ago to the emergence of the modern human species in Earth's Anthropocene. The book begins with an overview of the processes of evolutionary fitness, the epicenter of the principles of evolutionary biology. Whether through natural or experimental occurrence, evolutionary fitness has been found to be the cardinal instance of evolutionary links in an organism between its ancestral and contemporary states. The book then goes on to detail evolutionary trails and lineages of groups of organisms including mammalians, reptilians, and various fish. The final section of the book provides a look back at the evolutionary journey of "nonliving" or extinct organisms, versus the modern-day transition to "living" or extant organisms. The Evolutionary Biology of Extinct and Extant Organisms is the ideal resource for any researcher or advanced student in evolutionary studies, ranging from evolutionary biology to general life sciences. Provides an updated compendium of evolution research history Details the evolution trails of organisms, including mammals, reptiles, arthropods, annelids, mollusks, protozoa, and more Offers an accessible and easy-to-read presentation of complex, in-depth evolutionary biology facts and theories

This comprehensive book provides new insights into the morphological, metabolic, thermoregulatory, locomotory, diving, sensory, feeding, and sleep adaptations of Cetacea (whales and dolphins), Pinnipedia (seals, sea lions and walrus), Sirenia (manatees and dugongs) and sea otters for an aquatic life. Each chapter reviews the discoveries from previous studies and integrates recent research using new techniques and technology. Readers will gain an understanding of the remarkable adaptations that enable marine mammals to spend all or most of their lives at sea, often while hunting prey at depth.

This book is a collection of original research papers given at a symposium entitled "Sensory Systems and Behavior of Aquatic Mammals", hosted by the USSR Academy of Sciences. The meeting was held in Moscow from 16 to 25 October, 1991 and involved nearly 100 scientists from around the world. The major headings of the book correspond to the session topics at the symposium. This meeting was not the first dedicated to problems of sensory systems in aquatic mammals. Experts in this field met several times previously to discuss important problems of sensory functions in echolocating animals. symposia on biosonar systems were held in Frascati, Italy in 1966, then in Jersey, France in 1978, and in Helsingor, Denmark in 1986. Papers presented at these meetings were published in books that advanced significantly the understanding of sensory systems (Busnel and Fish, 1980; Nachtigall and Moore, 1988). Initially, echolocating bats were the main subjects of consideration. However, studies on echolocating aquatic mammals, whales and dolphins, increased from one meeting to the next. Indeed, aquatic mammals are of exceptional interest for studying the adaptation of sensory functions for echolocation in specific aquatic environments. As a natural consequence of these developments, the 1989 symposium in Rome was devoted specifically to the sensory systems of cetaceans (Thomas and Kastelein, 1990). This symposium was held within the Fifth International Theriological Congress and was attended by many scientists.

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