

Homberger Vertebrate Dissection

This classic laboratory manual offers instructions for the dissection of representative vertebrates for any vertebrate dissection course. It encourages & facilitates active & self-directed learning by students.

The vertebrate head is the most complex part of the animal body and its diversity in nature reflects a variety of life styles, feeding modes, and ecological adaptations. This book will take you on a journey to discover the origin and diversification of the head, which evolved from a seemingly headless chordate ancestor. Despite their structural diversity, heads develop in a highly conserved fashion in embryos. Major sensory organs like the eyes, ears, nose, and brain develop in close association with surrounding tissues such as bones, cartilages, muscles, nerves, and blood vessels. Ultimately, this integrated unit of tissues gives rise to the complex functionality of the musculoskeletal system as a result of sensory and neural feedback, most notably in the use of the vertebrate jaws, a major vertebrate innovation only lacking in hagfishes and lampreys. The cranium subsequently further diversified during the major transition from fishes living in an aquatic environment to tetrapods living mostly on land. In this book, experts will join forces to integrate, for the first time, state-of-the-art knowledge on the anatomy, development, function, diversity, and evolution of the head and jaws and their muscles within all major groups of extant vertebrates. Considerations about and comparisons with fossil taxa, including emblematic groups such as the dinosaurs, are

also provided in this landmark book, which will be a leading reference for many years to come.

This brief and specialized book was designed for general non-major biology courses and includes population ecology, communities, ecosystems, biosphere, human impact on the biosphere, and animal behavior.

ECOLOGY AND BEHAVIOR covers Unit VII from BIOLOGY: THE UNITY AND DIVERSITY OF LIFE, 11th Edition. For the 11th edition of BIOLOGY: UNITY AND DIVERSITY OF LIFE, Cecie Starr and Ralph Taggart made it their goal to "solve" some of the toughest Introductory Biology course challenges. We introduce a new issues-oriented approach with engages students in current, motivating biological topics; a built-in cross-referencing system for key topics; and, most importantly, time-saving media resources for instructors.

Detailed and concise dissection directions, updated valuable information and extraordinary illustrations make The Dissection of Vertebrates, 3rd Edition the new ideal manual for students in comparative vertebrate anatomy, as well as a superb reference for vertebrate and functional morphology, vertebrate paleontology, and advanced level vertebrate courses, such as in mammalogy, ornithology, ichthyology, and herpetology. This newly revised edition of the most comprehensive manual available continues to offer today's more visually oriented student with a manual combining pedagogically effective text with high-quality, accurate and attractive visual references. This new edition features updated and expanded phylogenetic coverage, revisions to the illustrations and text of the lamprey,

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shark, perch, mudpuppy, frog, cat, pigeon, and reptile skull chapters, and new sections on amphioxus or lancelet (*Branchiostoma*, Cephalochordata), a sea squirt (*Ciona*, Urochordata), shark musculature, a gravid shark, shark embryo, cat musculature, and the sheep heart. Using the same systematic approach within a systemic framework as the first two editions, *The Dissection of Vertebrates, 3rd Edition* covers several animals commonly used in providing an anatomical transition sequence. Nine animals are covered: amphioxus, sea squirt, lamprey, shark, perch, mudpuppy, frog, cat, and pigeon, plus five reptile skulls, two mammal skulls, and the sheep heart. Winner of a 2020 Textbook Excellence Award (College) (Texty) from the Textbook and Academic Authors Association

Seven detailed vertebrate dissections, providing a systemic approach
Includes carefully developed directions for dissection
Original, high-quality award-winning illustrations
Clear and sharp photographs
Expanded and updated features on phylogenetic coverage
New sections on: amphioxus (Cephalochordata); sea squirt (Urochordata); shark musculature; gravid shark; shark embryo; cat musculature; sheep heart

This book introduces students to the groups of vertebrates and explores the anatomical evolution of vertebrates within the context of the functional interrelationships of organs and the changing environments to which vertebrates have adapted. The text contains all of the material taught in classic comparative anatomy courses, but integrates this material with current research in functional anatomy.

This integration adds a new dimension to our understanding of structure and helps students understand the evolution of vertebrates.

Each volume contains chapters from the 1-volume version of the 10th ed. plus the appendices.

Histology is the discipline of biology that involves the microscopic examination of thin (5-7 [μ m]) stained tissue sections in order to study their structure and correlate it with function. This title presents a general reference guidance providing a set of histological images of fishes (about 40 species).

Consists of the proceedings of the Internationales Symposium über die Erkrankungen der Zootiere, 1959- ; proceedings of the Internationalen Symposiums über die Erkrankungen der Zoo- und Wildtiere, 2001-
Aus dem Inhalt: Peter Janich: Where does biology get its objects from? Mathias Gutmann: The status of organism: Towards a constructivist theory of organism Walter Bock: Explanations in a historical science Christine Hertler: Organism and morphology: Methodological differences between functional and constructional morphology Dominique G. Homberger: Similarities and differences: The distinctive approaches of systematics and comparative anatomy towards homology and analogy Raphael Falk: The organism as a necessary entity of evolution Franz M. Wuketits: The organism's place in evolution: Darwin's views and contemporary organismic theories Christian Kummer: The development of organismic structure and the philosophy behind Guiseppe Sermonti: The butterfly and the lion Harald Riedl: Organism - Ecosystem - Biosphere: Some comments on the organismic concept Sievert Lorenzen: How to advance from the theory of natural selection towards the General Theory of Self-Organization Antonio Lima-de-Faria: The

evolutionary periodicity of flight Hans-Rainer Duncker: The evolution of avian ontogenies: Determination of molecular evolution by integrated complex functional systems and ecological conditions Winfried Stefan Peters & Bernd Herkner: An outline of a theory of the constructional constraints governing early organismic evolution Werner E. G. Mueller e.a.: Monophyly of Metazoa: Phylogenetic analyses of genes encoding SerThr-kinases and a receptor Tyr-kinase from Porifera [sponges] Karl Edlinger: The evolution of the mollusc construction: Living organisms as energy-transforming systems Michael Gudo: A structural-functional approach to the soft bodies of rugose corals.

The Vertebrata is one of the most speciose groups of animals, comprising more than 58,000 living species. This book provides a detailed account on the comparative anatomy, development, homologies and evolution of the head, neck, pectoral and forelimb muscles of vertebrates. It includes hundreds of illustrations, as well as numerous tables showing the homologies between the muscles of all the major extant vertebrate taxa, including lampreys, elasmobranchs, hagfish, coelacanth, dipnoans, actinistians, teleosts, halecomorphs, ginglymodians, chondrosteans, caecilians, anurans, urodeles, turtles, lepidosaurs, crocodylians, birds, and mammals such as monotremes, rodents, tree-shrews, flying lemurs and primates, including modern humans. It also provides a list of more than a thousand synonyms that have been used by other authors to designate these muscles in the literature. Importantly, it also reviews data obtained in the fields of evolutionary developmental biology, molecular biology and embryology, and explains how this data helps to understand the evolution and homologies of vertebrate muscles. The book will be useful to students, teachers, and researchers working in fields such as functional morphology, ecomorphology, evolutionary developmental biology, zoology,

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molecular biology, evolution, and phylogeny. As the book includes crucial information about the anatomy, development, homologies, evolution and muscular abnormalities of our own species, *Homo sapiens*, it will also be helpful to physicians and medical students.

This volume presents a broad comparative anatomical approach towards the functional morphology of the middle ear of palaeognathous birds (ostrich, rhea, tinamous, emu, cassowary, kiwi) and basal neognathous birds. It presents the most complete and thoroughly studied source of material on this field. For the first time it became possible to develop exact images of "non-structures" like the air-filled spaces of the avian skull by using non-invasive CT-techniques, computer-aided 3D-reconstruction, and morphometry, and to evaluate their functional importance for sound transmission and amplification through the middle ear. A series of air brush drawings represent detailed three-dimensional images of middle ear structures and the pneumatic spaces of the otic region of the skull.

Vol. 18 (1938) "Seventy-five years; a history of the Buffalo society of natural sciences, 1861-1936" (3 p. 1., 5-204 p.).

Ant- and termite-eating mammals in the orders Xenarthra and Pholidota are often cited as examples of convergent evolution. This is a premature conclusion because the phylogenetic interrelationships of relevant taxa are controversial and the most thorough anatomical studies of relevant taxa are not comparative. The present study re-examines the phylogeny of xenarthran and pholidotan genera, documents the morphology of the feeding apparatus in representative xenarthran and pholidotan species and interprets it phylogenetically, and concludes with a review of structure, function and evolution of the feeding apparatus in ant- and termite-eating mammals. A

published data set containing a variety of morphological characters for xenarthran genera (Engelmann, 1978) was revised, extended to include the hypothetical xenarthran sister taxon Pholidota, and analyzed cladistically. Xenarthran monophyly was not supported and the pholidotan pangolins, which comprise the entire order, were placed in a clade with the xenarthran anteaters. The feeding apparatus of xenarthran anteaters (*Cyclopes didactylus*, *Tamandua mexicana*, *Myrmecophaga jubata*) was examined and found to be characterized by numerous muscular anomalies: sternoglossus muscles with a xiphoid origin comprise the tongue, small and simple jaw closing muscles, a mylohyoideus that arises from the dentary, basicranium and soft palate, a palatoglossus with basihyal origin that doesn't enter the tongue, no styloglossus, a robust stylopharyngeus that enters the soft palate, and a sternomandibularis. All but the last of these features was also found in pangolins (*Manis tricuspis*, *M. pentadactyla*, *M. javanica*). No other mammalian myrmecophage, including other myrmecophagous xenarthrans, shares this suite of characters; there is no evidence that these characters are non-independent. Cladistic analysis of all feeding apparatus muscles in Xenarthra and Pholidota (specifically, the anteater and pangolin taxa listed above, the armadillos *Dasypus novemcinctus* and *Chlamyphorus truncatus*, the sloths *Choloepus hoffmani* and *Bradypus variegatus*, the domestic dog *Canis familiaris* representing derived eutherians, and the marsupial opossum *Didelphis virginianus* as an outgroup) yields results identical to

those of the revised Engelmann data set. Consequently, the numerous uniquely derived features shared by anteaters and pangolins are interpreted as similarities inherited from a common myrmecophagous ancestor, and are not an example of convergent evolution. The emphasis in this volume is on the structure and functional design of the integument. The book starts with a brief introduction to some basic principles of physics (mechanics) including Newton's Three Laws of Motion. These principles are subsequently used to interpret the problems animals encounter in motion. It is in only the last 40 or so years that we have begun to understand how important a role the integument plays in the locomotion of many marine vertebrates. This involves the crossed-fiber architecture, which was first discovered in a classic study on nemertean worms. As a design principle we see that the crossed-fiber architecture is ubiquitous in nature. Research on some of the most dynamic marine vertebrates of the oceans – tuna, dolphins and sharks, and the extinct Jurassic ichthyosaurs – shows precisely how the crossed-fiber architecture contributes to high-speed swimming and (in lamnid sharks) may even aid in energy conservation. However, this design principle is not restricted to animals in the marine biota but is also found as far afield as the dinosaurs and, most recently, has been revealed as a major part of the microstructure of the most complex derivative of the integument, the feather. We see that a variety of phylogenetically diverse vertebrates take to the air by using skin flaps to glide from tree to tree or to the ground, and present detailed descriptions of innovations

developed in pursuit of improved gliding capabilities in both extinct and modern day gliders. But the vertebrate integument had even greater things in store, namely true or flapping flight. Pterosaurs were the first vertebrates to use the integument as a membrane in true flapping flight and these interesting extinct animals are discussed on the basis of past and cutting-edge research, most intriguingly with respect to the structure of the flight membrane. Bats, the only mammals that fly, also employ integumental flight membranes. Classic research on bat flight is reviewed and supplemented with the latest research, which shows the complexities of the wing beat cycle to be significantly different from that of birds, as revealed by particle image velocimetry. The book's largest chapter is devoted to birds, given that they make up nearly half of the over 22,000 species of tetrapods. The flight apparatus of birds is unique in nature and is described in great detail, with innovative research highlighting the complexity of the flight structures, bird flight patterns, and behavior in a variety of species. This is complimented by new research on the brains of birds, which shows that they are more complex than previously thought. The feather made bird flight possible, and was itself made possible by α -keratin, contributing to what may be a unique biomechanical microstructure in nature, a topic discussed in some depth. A highly polarized subject concerns the origin of birds and of the feather. Alleged fossilized protofeathers (primal simple feathers) are considered on the basis of histological and taphonomic investigative studies in Chapter 6. Finally, in Chapter 7 we discuss the controversies associated with

this field of research. Professor Theagarten Lingham-Soliar works at the Nelson Mandela Metropolitan University, Port Elizabeth and is an Honorary Professor of Life Sciences at the University of KwaZulu-Natal. Internal fertilization is universal in chondrichthyan fishes and, as such, requires a suite of biological activities, including behavioral, morphological and physiological mechanisms, to ensure successful copulation and fertilization. This volume correlates available data and ideas concerning the development, reproductive morphology, function, and

The cat has been used as a subject for dissection in the study of mammalian anatomy for almost two centuries. The very popular Pictorial Anatomy of the Cat by Stephen G. Gilbert, originally published in 1967 and now in its 12th printing, has been used in countless laboratories as a guide to dissection and supplement to introductory textbooks. Outline of Cat Anatomy is an abridged version of the original guide, modified for practical use in one-semester courses. It employs anatomical terms used in human rather than veterinary anatomy and includes illustrations of human anatomy that may be compared with those of the cat, especially useful for the many students who do not have access to human dissections. Gilbert's earlier Pictorial Anatomy of the Cat is "an excellent, well-illustrated dissection guide for use in courses in comparative anatomy. The text is informative and accurate, and instructions for dissection are clear and helpful.... Highly recommended." —Choice Accompanying CD-ROM covers topics in the same order as the text, with a quiz and flashcards for each chapter,

as well as hundreds of animations, interactive sequences, and movies, and a link to the publisher's biology website.

Brief non-major biology text includes Unit 1 and Unit II from BIOLOGY: THE UNITY AND DIVERSITY OF LIFE and gives access to media through 1Pass including BiologyNow, "How do I Prepare?," vMentor and Infotrac College edition.

Vertebrate Dissection Brooks Cole

An introductory overview of the functional biology of fish and how that may be affected by the contrasting habitat conditions within the aquatic environment. It describes the recent advances in comparative animal physiology which have greatly influenced our understanding of fish function as well as generating questions that have yet to be resolved. Fish taxa represent the largest number of vertebrates, with over 25,000 extant species. However, much of our knowledge, apart from taxonomy and habitat descriptions, has been based on relatively few of these species, usually those which live in fresh water and/or are of commercial interest. Unfortunately there has also been a tendency to base interpretation of fish physiology on that of mammalian systems, as well as to rely on a few type species of fish. This accessible textbook will redress the balance by using examples of fish from a wide range of species and habitats, emphasizing diversity as well as recognizing shared attributes with other

vertebrates.

The central focus of this book is the avian respiratory system. The authors explain why the respiratory system of modern birds is built the way it is and works the way that it does. Birds have been and continue to attract particular interest to biologists. The more birds are studied, the more it is appreciated that the existence of human-kind on earth very much depends directly and indirectly on the existence of birds. Regarding the avian respiratory system, published works are scattered in biological journals of fields like physiology, behavior, anatomy/morphology and ecology while others appear in as far afield as paleontology and geology. The contributors to this book are world-renowned experts in their various fields of study. Special attention is given to the evolution, the structure, the function and the development of the lung-air sac system. Readers will not only discover the origin of birds but will also learn how the respiratory system of theropod dinosaurs worked and may have transformed into the avian one. In addition, the work explores such aspects as swallowing mechanism in birds, the adaptations that have evolved for flight at extreme altitude and gas exchange in eggs. It is a highly informative and carefully presented work that provides cutting edge scientific insights for readers with an interest in the respiratory biology and the evolution of birds.

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. Every 3rd issue is a quarterly cumulation. This classic lab manual offers instructions for the dissection of representative vertebrates for any vertebrate dissection course.

Successor to the classic work in shark studies, *The Elasmobranch Fishes* by John Franklin Daniel (first published 1922, revised 1928 and 1934), *Sharks*,

Skates, and Rays provides a comprehensive and up-to-date overview of elasmobranch morphology. Coverage has been expanded from anatomy to include modern information on physiology and biochemistry. The new volume also provides equal treatment for skates and rays. The authors present general introductory material for the relative novice but also review the latest technical citations, making the book a valuable primary reference resource. More than 200 illustrations supplement the text. 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.

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