

Basic Paleontology Introduction To Paleobiology And The Fossil Record

A comprehensive compilation of important mammalian groups of the Santa Cruz Formation fossils, for academic researchers and graduate students.

The Evolution of Vertebrate Design is a solid introduction to vertebrate evolution, paleontology, vertebrate biology, and functional, comparative anatomy. Its lucid style also makes it ideal for general readers intrigued by fossil history. Clearly drawn diagrams illustrate biomechanical explanations of the evolution of fins, jaws, joints, and body shapes among vertebrates. A glossary of terms is included. "A luminous text is matched by lucid drawings rationally placed. . . . A great teaching monograph, the book will charm lay readers of fossil history. For virtually every college & public collection."—Scitech Book News

The Chesapeake Miocene will always be considered a paleontological treasure. Given the richness and accessibility of the Maryland and Virginia Miocene shell beds, it seems remarkable that very few people have ever described new species from these strata over the past 185 years. Until now. Integrating elements from paleontology, geology, environmental science, and ecology, Molluscan Paleontology of the Chesapeake Miocene assembles previous research and the authors' experience into a synoptic field guide. The most complete compendium of Miocene species created since 1904, this long-awaited resource lists nearly 500 species. It contains illustrations of 260 species, including more than 60 not found in any previous book and 26 newly discovered. It describes Chesapeake molluscan faunas in terms of local geology, paleoceanography, and marine paleobiology. Organized by stratigraphic geology, the book covers fossils of the Eastover, St Mary's, Choptank, and Calvert Formations. It illustrates 24 collecting sites and fossil exposures, showing details of in situ specimens, along with maps of 4 Miocene paleoseas and detailed stratigraphic columns for Maryland and northern Virginia. The text is accompanied by a CD-ROM with color illustrations of the forty known species of ephora shells. Armed with these, you should be able to identify the species found in the amazingly rich shell beds of the Chesapeake Bay area.

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.

The first introductory palaeontology text which demonstrates the importance of selected fossil groups in geological and biological studies, particularly in understanding evolutionary patterns, palaeoenvironmental analysis, and stratigraphy. Part one explores several key concepts, such as the processes of fossil preservation, the determination of evolutionary patterns, and use of fossils and stratigraphical tools. Part two introduces the main fossil groups of value in these applied fields. Part three concentrates on the examination of important case histories which demonstrate the use of fossils in diverse practical examples. Evolutionary studies, palaeoenvironmental analysis, and stratigraphical applications are documented using up-to-date examples supported by overviews of the principles.

One of the leading textbooks in its field, Bringing Fossils to Life applies paleobiological principles to the fossil record while detailing the evolutionary history of major plant and animal phyla. It incorporates current research from biology, ecology, and population genetics, bridging the gap between purely theoretical paleobiological textbooks and those that describe only invertebrate paleobiology and that emphasize cataloguing live organisms instead of dead objects. For this third edition Donald R. Prothero has revised the art and research throughout, expanding the coverage of invertebrates and adding a discussion of new methodologies and a chapter on the origin and early evolution of life.

The Triassic period is generally viewed as the beginning of the Age of Dinosaurs. For paleontologists, however, it also marks the rise of the world's first modern land ecosystems. Over the past three decades, extensive, worldwide fieldwork has led to the discovery of many new species of Triassic animals and plants, suggesting that faunal and floral changes already began in the Middle Triassic and were more protracted than previously thought. The Late Triassic is a pivotal time in the evolution of life on land, with many of the major groups of present-day vertebrates and insects first appearing in the fossil record. This book provides the first detailed overview of life on land during the Triassic period for advanced students and researchers. Noted vertebrate paleontologists Hans-Dieter Sues and Nicholas C. Fraser also review the biotic changes of this period and their possible causes.

The fossil record of giant flightless birds extends back to the Late Cretaceous, more than 70 million years ago, but our understanding of these extinct birds is still incomplete. This is partly because the number of specimens available is sometimes limited, but also because widely different approaches have been used to study them, with sometimes contradictory results. This book summarizes the current knowledge of the paleobiology of seven groups of giant flightless birds: Dinornithiformes, Aepyornithiformes, Dromornithidae, Phorusrhacidae, Brontornithidae, Gastornithidae and Gargantuavis. The first chapter presents the global diversity of these birds and reviews the tools and methods used to study their paleobiology. Chapters 2 to 8 are each dedicated to one of the seven groups of extinct birds. Finally, a conclusion offers a global synthesis of the

information presented in the book in an attempt to define a common evolutionary model. Focuses on the giant flightless birds that evolved independently in different parts of the world since the Cretaceous period Covers a number of different families with different evolutionary histories, providing a source of interesting comparisons Provides emphasis on the palaeobiology of these birds, including their evolution, adaptations, mode of life, ecology and extinction

Palaeontology, a fundamental topic in geology and evolutionary biology, has undergone exciting and rapid change in recent years. Contemporary debates on mass extinctions and the origin of life have had profound implications for our understanding of how life evolved. Basic Palaeontology is a comprehensive and accessible introduction to palaeontology. With in-depth analysis of basic principles and all the main fossil groups, this fully illustrated text presents new and exciting research on the origin and history of life. The text focuses on traditional topics such as marine invertebrate palaeontology and biostratigraphy, but also provides unique and unparalleled taxonomic coverage from microfossils to plants and vertebrates. Key Features include: - Covers important recent developments in macroevolution and mass extinctions - A strong focus on a statistical and quantitative approach, emphasising the vital importance of both applications and theory - Full coverage of the evolution of vertebrates and plants - Over 600 highly detailed illustrations - An accessible format with extensive boxed material and bullet points Basic

Palaeontology is essential reading for undergraduate students of geology, environmental science and biology, taking courses in palaeontology, palaeobiology, palaeoecology or evolution, and will also be of interest to all those who have an interest in the origin of life and human evolution. Michael J Benton is a Reader in the Department of Geology, University of Bristol, UK. David A T Harper is a Lecturer in Geology at the Department of Geology, University College Galway, Ireland.

This book presents a comprehensive overview of the science of the history of life. Paleobiologists bring many analytical tools to bear in interpreting the fossil record and the book introduces the latest techniques, from multivariate investigations of biogeography and biostratigraphy to engineering analysis of dinosaur skulls, and from homeobox genes to cladistics. All the well-known fossil groups are included, including microfossils and invertebrates, but an important feature is the thorough coverage of plants, vertebrates and trace fossils together with discussion of the origins of both life and the metazoans. All key related subjects are introduced, such as systematics, ecology, evolution and development, stratigraphy and their roles in understanding where life came from and how it evolved and diversified. Unique features of the book are the numerous case studies from current research that lead students to the primary literature, analytical and mathematical explanations and tools, together with associated problem sets and practical schedules for instructors and students. “..any serious student of geology who does not pick this book off the shelf will be putting themselves at a huge disadvantage. The material may be complex, but the text is extremely accessible and well organized, and the book ought to be essential reading for palaeontologists at undergraduate, postgraduate and more advanced levels—both in Britain as well as in North America.” Falcon-Lang, H., Proc. Geol. Assoc. 2010 “...this is an excellent introduction to palaeontology in general. It is well structured, accessibly written and pleasantly informativeI would recommend this as a standard reference text to all my students without hesitation.” David Norman Geol Mag 2010 Companion website This book includes a companion website at: www.blackwellpublishing.com/paleobiology The website includes:

- An ongoing database of additional Practical's prepared by the authors - Figures from the text for downloading - Useful links for each chapter - Updates from the authors

In the wake of the paleobiological revolution of the 1970s and 1980s, paleontologists continue to investigate far-reaching questions about how evolution works. Many of those questions have a philosophical dimension. How is macroevolution related to evolutionary changes within populations? Is evolutionary history contingent? How much can we know about the causes of evolutionary trends? How do paleontologists read the patterns in the fossil record to learn about the underlying evolutionary processes? Derek Turner explores these and other questions, introducing the reader to exciting recent work in the philosophy of paleontology and to theoretical issues including punctuated equilibria and species selection. He also critically examines some of the major accomplishments and arguments of paleontologists of the last 40 years.

Rereading the Fossil Record presents the first-ever historical account of the origin, rise, and importance of paleobiology, from the mid-nineteenth century to the late 1980s. Drawing on a wealth of archival material, David Sepkoski shows how the movement was conceived and promoted by a small but influential group of paleontologists and examines the intellectual, disciplinary, and political dynamics involved in the ascendancy of paleobiology. By tracing the role of computer technology, large databases, and quantitative analytical methods in the emergence of paleobiology, this book also offers insight into the growing prominence and centrality of data-driven approaches in recent science.

This book presents a comprehensive overview of the science of the history of life. Paleobiologists bring many analytical tools to bear in interpreting the fossil record and the book introduces the latest techniques, from multivariate investigations of biogeography and biostratigraphy to engineering analysis of dinosaur skulls, and from homeobox genes to cladistics. All the well-known fossil groups are included, including microfossils and invertebrates, but an important feature is the thorough coverage of plants, vertebrates and trace fossils together with discussion of the origins of both life and the metazoans. All key related subjects are introduced, such as systematics, ecology, evolution and development, stratigraphy and their roles in understanding where life came from and how it evolved and diversified. Unique features of the book are the numerous case studies from current research that lead students to the primary literature, analytical and mathematical explanations and tools, together with associated problem sets and practical schedules for instructors and students. “..any serious student of geology who does not pick this book off the shelf will be putting themselves at a huge disadvantage. The material may be complex, but the text is extremely accessible and well organized, and the book ought to be essential reading for palaeontologists at undergraduate, postgraduate and more advanced levels—both in Britain as well as in North America.” Falcon-Lang, H., Proc. Geol. Assoc. 2010 “...this is an excellent introduction to palaeontology in general. It is well structured, accessibly written and pleasantly informativeI would recommend this as a standard reference text to all my students without hesitation.” David Norman Geol Mag 2010 Companion website This book includes a companion website at:

www.blackwellpublishing.com/paleobiology The website includes: - An ongoing database of additional Practical's prepared by the authors - Figures from the text for downloading - Useful links for each chapter - Updates from the authors

The study of dinosaurs has been experiencing a remarkable renaissance over the past few decades. Scientific understanding of dinosaur anatomy, biology, and evolution has advanced to such a degree that paleontologists often know more about 100-million-year-old dinosaurs than many species of living organisms. This book provides a contemporary review of dinosaur

science intended for students, researchers, and dinosaur enthusiasts. It reviews the latest knowledge on dinosaur anatomy and phylogeny, how dinosaurs functioned as living animals, and the grand narrative of dinosaur evolution across the Mesozoic. A particular focus is on the fossil evidence and explicit methods that allow paleontologists to study dinosaurs in rigorous detail. Scientific knowledge of dinosaur biology and evolution is shifting fast, and this book aims to summarize current understanding of dinosaur science in a technical, but accessible, style, supplemented with vivid photographs and illustrations. The Topics in Paleobiology Series is published in collaboration with the Palaeontological Association, and is edited by Professor Mike Benton, University of Bristol. Books in the series provide a summary of the current state of knowledge, a trusted route into the primary literature, and will act as pointers for future directions for research. As well as volumes on individual groups, the series will also deal with topics that have a cross-cutting relevance, such as the evolution of significant ecosystems, particular key times and events in the history of life, climate change, and the application of a new techniques such as molecular palaeontology. The books are written by leading international experts and will be pitched at a level suitable for advanced undergraduates, postgraduates, and researchers in both the paleontological and biological sciences. Additional resources for this book can be found at: <http://www.wiley.com/go/brusatte/dinosaurpaleobiology>.

Living amniotes—including all mammals, birds, crocodylians, snakes, and turtles—comprise an extraordinarily varied array of more than 21,000 species. Found in every major habitat on earth, they possess a truly remarkable range of morphological, ecological, and behavioral adaptations. The fossil record of amniotes extends back three hundred million years and reveals much about modern biological diversity of form and function. A collaborative effort of twenty-four researchers, *Amniote Paleobiology* presents thirteen new and important scientific perspectives on the evolution and biology of this familiar group. It includes new discoveries of dinosaurs and primitive relatives of mammals; studies of mammalian chewing and locomotion; and examinations of the evolutionary process in plesiosaurs, mammals, and dinosaurs. Emphasizing the rich variety of analytical techniques available to vertebrate paleontologists—from traditional description to multivariate morphometrics and complex three-dimensional kinematics—*Amniote Paleobiology* seeks to understand how species are related to each other and what these relationships reveal about changes in anatomy and function over time. A timely synthesis of modern contributions to the field of evolutionary studies, *Amniote Paleobiology* furthers our understanding of this diverse group.

The fossil record contains unique long-term insights into how ecosystems form and function which cannot be determined simply by examining modern systems. It also provides a record of endangered species through time, which allow us to make conservation decisions based on thousands to millions of years of information. The aim of this book is to demonstrate how palaeontological data has been or could be incorporated into ecological or conservation scientific studies. This book will be written by palaeontologists for modern ecologists and conservation scientists. Manuscripts will fall into one (or a combination) of four broad categories: case studies, review articles, practical considerations and future directions. This book will serve as both a 'how to guide' and provide the current state of knowledge for this type of research. It will highlight the unique and critical insights that can be gained by the inclusion of palaeontological data into modern ecological or conservation studies.

This volume describes and explores the emerging discipline of conservation paleobiology, and addresses challenges faced by established and young Conservation Paleobiologist's alike. In addition, this volume includes applied research highlighting how conservation paleobiology can be used to understand ecosystem response to perturbation in near and deep time. Across 10 chapters, the book aims to (1) explore the goals of conservation paleoecology as a science, (2) highlight how conservation paleoecology can be used to understand ecosystems' responses to crises, (3) provide case studies of applications to modern ecosystems, (4) develop novel applications of paleontological approaches to neontological data, and (5) present a range of ecosystem response and recovery through environmental crises, from high-resolution impacts on organism interactions to the broadest scale of responses of the entire marine biosphere to global change. The volume will be of interest to paleoecologists, paleobiologists, and conservation biologists.

Macroevolutionary inference has historically been treated as a two-step process, involving the inference of a tree, and then inference of a macroevolutionary model using that tree. Newer models blend the two steps. These methods make more complete use of fossils than the previous generation of Bayesian phylogenetic models. They also involve many more parameters than prior models, including parameters about which empiricists may have little intuition. In this paper, we set forth a framework for fitting complex, hierarchical models. The authors ultimately fit and use a joint tree and diversification model to estimate a dated phylogeny of the Cincta (Echinodermata), a morphologically distinct group of Cambrian echinoderms that lack the five-fold radial symmetry characteristic of extant members of the phylum. Although the phylogeny of cinctans remains poorly supported in places, this Element shows how models of character change and diversification contribute to understanding patterns of phylogenetic relatedness and testing macroevolutionary hypotheses.

Introduction to Paleobiology and the Fossil Record John Wiley & Sons

"This is the most comprehensive overview and analysis of sauropod dinosaurs ever written."—Jason Head, Department of Paleobiology, Smithsonian Institution

A newly revised and fully updated edition of the market-leading introduction to paleontology Designed for students and anyone else with an interest in the history of life on our planet, the new edition of this classic text describes the biological evolution of Earth's organisms, and reconstructs their adaptations and the ecology and environments in which they functioned. Cowen's *History of Life*, 6th Edition includes major updates, including substantial rewrites to chapters on the origins of eukaryotes, the Cambrian explosion, the terrestrialization of plants and animals, the Triassic recovery of life, the origin of birds, the end-Cretaceous mass extinction, and human evolution. It also features new chapters on plants, soils and transformation of the land; the Mesozoic marine revolution; and the evolution of oceans and climates. Beginning with the origin of the Earth and the earliest life

on earth, the book goes on to offer insightful contributions covering: the evolution of Metazoans; the early vertebrates; life of vertebrates on land; and early amniotes and thermoregulation. The book also looks at: dinosaur diversity, as well as their demise; early mammals; the rise of modern mammals; the Neogene Savannas; primates; life in the ice ages; and more. Covers the breadth of the subject in a concise yet specific way for undergrads with no academic background in the topic Reorganizes all chapters to reflect the geological series of events, enabling a new focus on big events Updated with three brand new chapters and numerous revised ones Put together by a new editorial team internationally recognized as the global leaders in paleontology Filled with illustrations and photographs throughout Includes diagrams to show internal structures of organisms, cladograms, time scales and events, and paleogeographic maps Supplemented with a dedicated website that explores additional enriching information and discussion, and which features images for use in visual presentations Cowen's History of Life, 6th Edition is an ideal book for undergraduate students taking courses in introductory paleontology, as well those on global change and earth systems.

This book presents a comprehensive overview of the science of the history of life. Paleobiologists bring many analytical tools to bear in interpreting the fossil record and the book introduces the latest techniques, from multivariate investigations of biogeography and biostratigraphy to engineering analysis of dinosaur skulls, and from homeobox genes to cladistics. All the well-known fossil groups are included, including microfossils and invertebrates, but an important feature is the thorough coverage of plants, vertebrates and trace fossils together with discussion of the origins of both life and the metazoans. All key related subjects are introduced, such as systematics, ecology, evolution and development, stratigraphy and their roles in understanding where life came from and how it evolved and diversified. Unique features of the book are the numerous case studies from current research that lead students to the primary literature, analytical and mathematical explanations and tools, together with associated problem sets and practical schedules for instructors and students. New to this edition The text and figures have been updated throughout to reflect current opinion on all aspects New case studies illustrate the chapters, drawn from a broad distribution internationally Chapters on Macroevolution, Form and Function, Mass extinctions, Origin of Life, and Origin of Metazoans have been entirely rewritten to reflect substantial advances in these topics There is a new focus on careers in paleobiology

A recent renaissance in the field of "event" stratigraphy has promoted a much more thorough examination of the geologic record of particular fossil-bearing strata. This reference work compiles the findings of leading researchers on fossil beds, epiboles and global bioevents, mapping out a definitive temporal and regional classification of event horizons. Based primarily on research with Lower and Middle Paleozoic rocks of eastern North America, 'this volume significantly links these events to relatively short-term phenomena, including storms and climate-forcing cycles. An invaluable resource for specialists and students in the fields of paleontology, paleoecology, stratigraphy, and sedimentology, Paleontological Events helps to clarify the biological and taphonomic significance of these horizons.

Whether the fossil record should be read at face value or whether it presents a distorted view of the history of life is an argument seemingly as old as many fossils themselves. In the late 1700s, Georges Cuvier argued for a literal interpretation, but in the early 1800s, Charles Lyell's gradualist view of the earth's history required a more nuanced interpretation of that same record. To this day, the tension between literal and interpretive readings lies at the heart of paleontological research, influencing the way scientists view extinction patterns and their causes, ecosystem persistence and turnover, and the pattern of morphologic change and mode of speciation. With Stratigraphic Paleobiology, Mark E. Patzkowsky and Steven M. Holland present a critical framework for assessing the fossil record, one based on a modern understanding of the principles of sediment accumulation. Patzkowsky and Holland argue that the distribution of fossil taxa in time and space is controlled not only by processes of ecology, evolution, and environmental change, but also by the stratigraphic processes that govern where and when sediment that might contain fossils is deposited and preserved. The authors explore the exciting possibilities of stratigraphic paleobiology, and along the way demonstrate its great potential to answer some of the most critical questions about the history of life: How and why do environmental niches change over time? What is the tempo and mode of evolutionary change and what processes drive this change? How has the diversity of life changed through time, and what processes control this change? And, finally, what is the tempo and mode of change in ecosystems over time?

The Paleobiological Revolution chronicles the incredible ascendance of the once-maligned science of paleontology to the vanguard of a field. With the establishment of the modern synthesis in the 1940s and the pioneering work of George Gaylord Simpson, Ernst Mayr, and Theodosius Dobzhansky, as well as the subsequent efforts of Stephen Jay Gould, David Raup, and James Valentine, paleontology became embedded in biology and emerged as paleobiology, a first-rate discipline central to evolutionary studies. Pairing contributions from some of the leading actors of the transformation with overviews from historians and philosophers of science, the essays here capture the excitement of the seismic changes in the discipline. In so doing, David Sepkoski and Michael Ruse harness the energy of the past to call for further study of the conceptual development of modern paleobiology.

Overview of paleontology and how these specialists do their jobs.

In conservation, perhaps no better example exists of the past informing the present than the return of the California condor to the Vermilion Cliffs of Arizona. Extinct in the region for nearly one hundred years, condors were successfully reintroduced starting in the 1990s in an effort informed by the fossil record—condor skeletal remains had been found in the area's late-Pleistocene cave deposits. The potential benefits of applying such data to conservation initiatives are unquestionably great, yet integrating the relevant disciplines has proven challenging. Conservation Paleobiology gathers a remarkable array of scientists—from Jeremy B. C. Jackson to Geerat J. Vermeij—to provide an authoritative overview

of how paleobiology can inform both the management of threatened species and larger conservation decisions. Studying endangered species is difficult. They are by definition rare, some exist only in captivity, and for those still in their native habitats any experimentation can potentially have a negative effect on survival. Moreover, a lack of long-term data makes it challenging to anticipate biotic responses to environmental conditions that are outside of our immediate experience. But in the fossil and microfossil records—from natural accumulations such as reefs, shell beds, and caves to human-made deposits like kitchen middens and archaeological sites—enlightening parallels to the Anthropocene can be found that might serve as a primer for present-day predicaments. Offering both deep-time and near-time perspectives and exploring a range of ecological and evolutionary dynamics and taxa from terrestrial as well as aquatic habitats, *Conservation Paleobiology* is a sterling demonstration of how the past can be used to manage for the future, giving new hope for the creation and implementation of successful conservation programs.

This study provides a stimulating critique of contemporary evolutionary thought, analyzing the Modern Synthesis first developed by Theodosius Dobzhansky, Ernst Mayr, and George Gaylord Simpson. The author argues that although only genes and organisms are taken as historic "individuals" in conventional theory, species, higher taxa, and ecological entities such as populations and communities should also be construed as individuals—an approach that yields the ecological and genealogical hierarchies that interact to produce evolution. This clearly stated, controversial work will provoke much debate among evolutionary biologists, systematists, paleontologists, and ecologists, as well as a wide range of educated lay readers.

During the last 10 years numerical methods have begun to dominate paleontology. These methods now reach far beyond the fields of morphological and phylogenetic analyses to embrace biostratigraphy, paleobiogeography, and paleoecology. *Paleontological Data Analysis* explains the key numerical techniques in paleontology, and the methodologies employed in the software packages now available. Following an introduction to numerical methodologies in paleontology, and to univariate and multivariate techniques (including inferential testing), there follow chapters on morphometrics, phylogenetic analysis, paleobiogeography and paleoecology, time series analysis, and quantitative biostratigraphy. Each chapter describes a range of techniques in detail, with worked examples, illustrations, and appropriate case histories. Describes the purpose, type of data required, functionality, and implementation of each technique, together with notes of caution where appropriate. The book and the accompanying PAST software package (see www.blackwellpublishing.com/hammer) are important investigative tools in a rapidly developing field characterized by many exciting new discoveries and innovative techniques. An invaluable tool for all students and researchers involved in quantitative paleontology.

This Very Short Introduction presents a succinct and accessible guide to the key episodes in the story of life on earth - from the very origins of life four billion years ago to the extraordinary diversity of species around the globe today.

Explains in a clear and concise manner the factors involved in the description and classification of fossils and the practical applications of paleontologic data.

A study of the Burgess Shale, a sea bed 530 million years old, and attempts to tackle what the findings are and what it means.

The literature of paleobiology is brimming with qualifiers and cautions about using species in the fossil record, or equating such species with those recognized among living organisms. *Species and Speciation in the Fossil Record* digs through this literature and surveys the recent research on species in paleobiology. In these pages, experts in the field examine what they think species are in their particular taxon of specialty or more generally in the fossil record. They also reflect on what the answers mean for thinking about species in macroevolution. The first step in this approach is an overview of the Modern Synthesis, and paleobiology's development of quantitative ways of documenting and analyzing variation with fossil assemblages. Following that, this volume's central chapters explore the challenges of recognizing and defining species from fossil specimens, and show how with careful interpretation and a clear species concept, fossil species may be sufficiently robust for meaningful paleobiological analyses. Tempo and mode of speciation over time are also explored, exhibiting how the concept of species, if more refined, can reveal enormous amounts about the interplay between species origins and extinction and local and global climate change."

This is the first text to combine both paleontology and paleobiology. Traditional textbooks treat these separately, despite the recent trend to combine them in teaching. It bridges the gap between purely theoretical paleobiology and purely descriptive invertebrate paleontology books. The text is targeted at undergraduate geology and biology majors, with the emphasis on organisms, rather than dead objects to be described and catalogued. Current ideas from modern biology, ecology, population genetics, and many other concepts will be applied to the study of the fossil record.

Polycystine radiolaria are exclusively marine protists and are found in all ocean waters, from polar regions to the tropics, and at all water depths. There are approximately 600 distinct described living species and several thousand fossil species of polycystines. Radiolarians in general, and polycystines in particular, have recently been shown to be a major component of the living plankton and important to the oceanic carbon cycle. As fossils radiolarians are also fairly common, and often occur in sediments where other types of fossils are absent. This has made them very valuable for certain types of geologic research, particularly estimating the geologic age of the sediments containing them, and as guides to past oceanic water conditions. As our current understanding of the biology, and even taxonomy of the living fauna is still very incomplete, evolutionary studies based on living polycystines are still rare. However, the common occurrence of numerous specimens for many species, and in a wide variety of oceanic environments, provides an excellent opportunity to study the processes of biologic evolution in the fossil record. *Paleobiology of the Polycystine Radiolaria* is the first major book on radiolarians to appear in the western literature since 2001. Focusing on living and fossil siliceous shelled radiolarians, it is notable for its emphasis not upon morphologic or taxonomic detail but on concepts and applications. The book attempts to provide a balanced, critical review of what is known of the biology, ecology, and fossil record of the group, as well as their use in evolutionary, biostratigraphic and paleoceanographic research. Full chapters on the history of study, and molecular biology, are the first ever in book form. Written for an audience of advanced undergraduate to doctoral students, as well as for a broad range of professionals in the biological and Earth sciences, *Paleobiology of the Polycystine Radiolaria* summarizes current understanding of the marine planktonic protist group polycystine radiolaria, both in living and fossil form.

Integration of research experiences into the undergraduate classroom can result in increased recruitment, retention, and motivation of science students. 'Big data' science initiatives, such as the Paleobiology

Database (PBDB), can provide inexpensive and accessible research opportunities. This Element provides an introduction to what the PBDB is, how to use it, how it can be deployed in introductory and advanced courses, and examples of how it has been used in undergraduate research. The PBDB aims to provide information on all fossil organisms, across the tree of life, around the world, and through all of geologic time. The PBDB Resource Page contains a range of PBDB tutorials and activities for use in physical geology, historical geology, paleontology, sedimentology, and stratigraphy courses. As two-year colleges, universities, and distance-based learning initiatives seek research-based alternatives to traditional lab exercises, the PBDB can provide opportunities for hands-on science activities.

This book presents a comprehensive overview of the science of the history of life. Paleobiologists bring many analytical tools to bear in interpreting the fossil record and the book introduces the latest techniques, from multivariate investigations of biogeography and biostratigraphy to engineering analysis of dinosaur skulls, and from homeobox genes to cladistics. All the well-known fossil groups are included, including microfossils and invertebrates, but an important feature is the thorough coverage of plants, vertebrates and trace fossils together with discussion of the origins of both life and the metazoans. All key related subjects are introduced, such as systematics, ecology, evolution and development, stratigraphy and their roles in understanding where life came from and how it evolved and diversified. Unique features of the book are the numerous case studies from current research that lead students to the primary literature, analytical and mathematical explanations and tools, together with associated problem sets and practical schedules for instructors and students. “..any serious student of geology who does not pick this book off the shelf will be putting themselves at a huge disadvantage. The material may be complex, but the text is extremely accessible and well organized, and the book ought to be essential reading for palaeontologists at undergraduate, postgraduate and more advanced levels—both in Britain as well as in North America.” Falcon-Lang, H., Proc. Geol. Assoc. 2010 “...this is an excellent introduction to palaeontology in general. It is well structured, accessibly written and pleasantly informativeI would recommend this as a standard reference text to all my students without hesitation.” David Norman Geol Mag 2010 Companion website This book includes a companion website at: www.blackwellpublishing.com/paleobiology The website includes: · An ongoing database of additional Practical's prepared by the authors · Figures from the text for downloading · Useful links for each chapter · Updates from the authors

The horse has frequently been used as a classic example of long-term evolution because it possesses an extensive fossil record. This book synthesizes the large body of data and research relevant to an understanding of fossil horses from perspectives such as biology, geology, paleontology.

Over the past twenty years, the study of dinosaurs has transformed into a true scientific discipline. New technologies have revealed secrets locked in prehistoric bones that no one could have previously predicted. We can now work out the color of dinosaurs, the force of their bite, their top speeds, and even how they cared for their young. Remarkable new fossil discoveries--giant sauropod dinosaur skeletons in Patagonia, dinosaurs with feathers in China, and a tiny dinosaur tail in Burmese amber--remain the lifeblood of modern paleobiology. Thanks to advances in technologies and methods, however, there has been a recent revolution in the scope of new information gleaned from such fossil finds. In *Dinosaurs Rediscovered*, leading paleontologist Michael J. Benton gathers together all of the latest paleontological evidence, tracing the transformation of dinosaur study from its roots in antiquated natural history to an indisputably scientific field. Among other things, this book explores how dinosaur remains are found and excavated, and how paleontologists read the details of dinosaurs' lives from their fossils--their colors, their growth, and even whether we will ever be able to bring them back to life. Benton's account shows that, though extinct, dinosaurs are still very much a part of our world.

[Copyright: aa6e7058286f94763bd2017f5e118039](http://www.blackwellpublishing.com/paleobiology)