The Comparative Method In Evolutionary Biology

The Comparative Method in Evolutionary Biology-Paul H. Harvey 1998 The first volume in the Oxford Series in Ecology and Evolution, this important new book explains how and when to use the comparative method and shows how this approach complements other approaches to problem-solving in evolution such as optimality theory, population genetic models, and experimentation. The authors provide thorough discussion of techniques and also worked examples. Their work will be of interest to all students of evolution.
The Comparative Approach in Evolutionary Anthropology and Biology-Charles L. Nunn 2011-11-30 Comparison is fundamental to evolutionary anthropology. When scientists study chimpanzee cognition, for example, they compare chimp performance on cognitive tasks to the performance of human children on the same tasks. And when new fossils are found, such as those of the tiny humans of Flores, scientists compare these remains to other fossils and contemporary humans. Comparison provides a way to draw general inferences about the evolution of traits and therefore has long been the cornerstone of efforts to understand biological and cultural diversity. Individual studies of fossilized remains, living species, or human populations are the essential units of analysis in a comparative study; bringing these elements into a broader comparative framework allows the puzzle pieces to fall into place, creating a means of testing adaptive hypotheses and generating new ones. With this book, Charles L. Nunn intends to ensure that evolutionary anthropologists and organismal biologists have the tools to realize the potential of comparative research. Nunn provides a wide-ranging investigation of the comparative foundations of evolutionary anthropology in past and present research, including studies of animal behavior, biodiversity, linguistic evolution, allometry, and cross-cultural variation. He also points the way to the future, exploring the new phylogeny-based comparative approaches and offering a how-to manual for scientists who wish to incorporate these new methods into their research.
Modern Phylogenetic Comparative Methods and Their Application in Evolutionary Biology-László Zsolt Garamszegi 2014-07-29 Phylogenetic comparative approaches are powerful analytical tools for making evolutionary inferences from interspecific data and phylogenies. The phylogenetic toolkit available to evolutionary biologists is currently growing at an incredible speed, but most methodological papers are published in the specialized statistical literature and many are incomprehensible for the user community. This textbook provides an overview of several newly developed phylogenetic comparative methods that allow to investigate a broad array of questions on how phenotypic characters evolve along the branches of phylogeny and how such mechanisms shape complex animal communities and interspecific interactions. The individual chapters were written by the leading experts in the field and using a language that is accessible for practicing evolutionary biologists. The authors carefully explain the philosophy behind different methodologies and provide pointers – mostly using a dynamically developing online interface – on how these methods can be implemented in practice. These “conceptual” and “practical” materials are essential for expanding the qualification of both students and scientists, but also offer a valuable resource for educators. Another value of the book are the accompanying online resources (available at: http://www.mpcm-evolution.com), where the authors post and permanently update practical materials to help embed methods into practice.
Phylogenies and the Comparative Method in Animal Behavior-Emília P. Martins 1996 In the last ten years, the comparative method has been revolutionized by modern statistical ways of incorporating phylogenies into the design and analysis of comparative studies. The results of this revolution are particularly important in the study of animal behavior, which has relied on interspecific comparisons to infer universal trends and evolutionary patterns. The chapters of this edited volume consider the impact of modern phylogenetic comparative methods on the study of animal behavior and discuss the main issues that need to be considered in design and analysis of a comparative study, considers possible differences

between the evolution of behavior and the evolution of morphology, and reviews how phylogenetic comparative studies have been used in certain areas of behavioral research.

The Comparative Approach in Evolutionary Anthropology and Biology-Charles L. Nunn 2011-07-05 Comparison is fundamental to evolutionary anthropology. When scientists study chimpanzee cognition, for example, they compare chimp performance on cognitive tasks to the performance of human children on the same tasks. And when new fossils are found, such as those of the tiny humans of Flores, scientists compare these remains to other fossils and contemporary humans. Comparison provides a way to draw general inferences about the evolution of traits and therefore has long been the cornerstone of efforts to understand biological and cultural diversity. Individual studies of fossilized remains, living species, or human populations are the essential units of analysis in a comparative study; bringing these elements into a broader comparative framework allows the puzzle pieces to fall into place, creating a means of testing adaptive hypotheses and generating new ones. With this book, Charles L. Nunn intends to ensure that evolutionary anthropologists and organismal biologists have the tools to realize the potential of comparative research. Nunn provides a wide-ranging investigation of the comparative foundations of evolutionary anthropology in past and present research, including studies of animal behavior, biodiversity, linguistic evolution, allometry, and cross-cultural variation. He also points the way to the future, exploring the new phylogeny-based comparative approaches and offering a how-to manual for scientists who wish to incorporate these new methods into their research.

Molecular Evolution-Ziheng Yang 2014 "Studies of evolution at the molecular level have experienced phenomenal growth in the last few decades, due to rapid accumulation of genetic sequence data, improved computer hardware and software, and the development of sophisticated analytical methods. The flood of genomic data has generated an acute need for powerful statistical methods and efficient computational algorithms to enable their effective analysis and interpretation. This advanced textbook is aimed at graduate level students and professional researchers (both empiricists and theoreticians) in the fields of bioinformatics and computational biology, statistical genomics, evolutionary biology, molecular systematics, and population genetics. It will also be of relevance and use to a wider audience of applied statisticians, mathematicians, and computer scientists working in computational biology."--back cover.

Phylogenetic Comparative Methods-Luke J. Harmon 2018-05-23 An introduction to statistical analyses of phylogenetic trees using comparative methods.

Analysis of Phylogenetics and Evolution with R-Emmanuel Paradis 2011-11-06 The increasing availability of molecular and genetic databases coupled with the growing power of computers gives biologists opportunities to address new issues, such as the patterns of molecular evolution, and re-assess old ones, such as the role of adaptation in species diversification. In the second edition, the book continues to integrate a wide variety of data analysis methods into a single and flexible interface: the R language. This open source language is available for a wide range of computer systems and has been adopted as a computational environment by many authors of statistical software. Adopting R as a main tool for phylogenetic analyses will ease the workflow in biologists' data analyses, ensure greater scientific repeatability, and enhance the exchange of ideas and methodological developments. The second edition is completed updated, covering the full gamut of R packages for this area that have been introduced to the market since its previous publication five years ago. There is also a new chapter on the simulation of evolutionary data. Graduate students and researchers in evolutionary biology can use this book as a reference for data analyses, whereas researchers in bioinformatics interested in evolutionary analyses will learn how to implement these methods in R. The book starts with a presentation of different R packages and gives a short introduction to R for phylogeneticists unfamiliar with this language. The basic phylogenetic topics are covered: manipulation of phylogenetic data, phylogeny estimation, tree drawing, phylogenetic comparative methods, and estimation of ancestral characters. The chapter on tree drawing uses R's powerful graphical

environment. A section deals with the analysis of diversification with phylogenies, one of the author's favorite research topics. The last chapter is devoted to the development of phylogenetic methods with R and interfaces with other languages (C and C++). Some exercises conclude these chapters.

The Major Metaphors of Evolution-Salvatore J. Agosta 2020-08-29 This book presents a unified evolutionary framework based on three sets of metaphors that will help to consolidate discussions on evolutionary transitions. Evolution is the unifying principle of life, making identifying ways to apply evolutionary principles to tackle existence-threatening crises such as climate change crucial. A more cohesive evolutionary framework will further the discussions in this regard and also accelerate the process itself. This book lays out a framework based on three dualistic classes of metaphors – time, space, and conflict resolution. Evolutionary transitions theory shows how metaphors can help us understand selective diversification, as Darwin described with his “tree of life”. Moreover, the recently proposed Stockholm paradigm demonstrates how metaphors can help shed light on the emergence of complex ecosystems that Darwin highlighted with his “tangled bank” metaphor. Taken together, these ideas offer proactive measures for coping with existential crises for humanity, such as climate change. The book will appeal to biologists, philosophers and historians alike.

Parasite Biodiversity-Robert Poulin 2014-05-27 This comprehensive, groundbreaking book on the biodiversity of parasites offers a clear and accessible explanation of how parasite biodiversity provides insight into the history and biogeography of other organisms, the structure of ecosystems, and the processes that lead to the diversification of life.

Phylogenetic Comparative Methods in R-Liam J. Revell 2022-07-12 An authoritative introduction to the latest comparative methods in evolutionary biology Phylogenetic comparative methods are a suite of statistical approaches that enable biologists to analyze and better understand the evolutionary tree of life, and shed vital new light on patterns of divergence and common ancestry among all species on Earth. This textbook shows how to carry out phylogenetic comparative analyses in the R statistical computing environment. Liam Revell and Luke Harmon provide an incisive conceptual overview of each method along with worked examples using real data and challenge problems that encourage students to learn by doing. By working through this book, students will gain a solid foundation in these methods and develop the skills they need to interpret patterns in the tree of life. Covers every major method of modern phylogenetic comparative analysis in R Explains the basics of R and discusses topics such as trait evolution, diversification, trait-dependent diversification, biogeography, and visualization Features a wealth of exercises and challenge problems Serves as an invaluable resource for students and researchers, with applications in ecology, evolution, anthropology, disease transmission, conservation biology, and a host of other areas Written by two of today’s leading developers of phylogenetic comparative methods

Sequence — Evolution — Function-Eugene V. Koonin 2013-06-29 Sequence - Evolution - Function is an introduction to the computational approaches that play a critical role in the emerging new branch of biology known as functional genomics. The book provides the reader with an understanding of the principles and approaches of functional genomics and of the potential and limitations of computational and experimental approaches to genome analysis. Sequence - Evolution - Function should help bridge the "digital divide" between biologists and computer scientists, allowing biologists to better grasp the peculiarities of the emerging field of Genome Biology and to learn how to benefit from the enormous amount of sequence data available in the public databases. The book is non-technical with respect to the computer methods for genome analysis and discusses these methods from the user's viewpoint, without addressing mathematical and algorithmic details. Prior practical familiarity with the basic methods for sequence analysis is a major advantage, but a reader without such experience will be able to use the book as an introduction to these methods. This book is perfect for introductory level courses in computational methods for comparative and functional genomics.

Phylogenetic Comparative Methods: A User's Guide for Paleontologists-Laura C. Soul 2021-04-30 Recent advances in statistical approaches called Phylogenetic Comparative Methods (PCMs) have provided paleontologists with a powerful set of analytical tools for investigating evolutionary tempo and mode in fossil lineages. However, attempts to integrate PCMs with fossil data often present workers with practical challenges or unfamiliar literature. This Element presents guides to the theory behind, and the application of, PCMs with fossil taxa. Based on an empirical dataset of Paleozoic crinoids, it presents example analyses to illustrate common applications of PCMs to fossil data, including investigating patterns of correlated trait evolution and macroevolutionary models of morphological change. It then emphasizes the importance of accounting for sources of uncertainty and discusses how to evaluate model fit and adequacy. Finally, this Element discusses several promising methods for modelling heterogeneous evolutionary dynamics with fossil phylogenies. Integrating phylogeny-based approaches with the fossil record provides a rigorous, quantitative perspective to understanding key patterns in the history of life.

Evolutionary Biomechanics-Graham K. Taylor 2014 This title discusses the study of evolution through the analysis of biomechanical systems. Instead of reviewing the entire breadth of the biomechanical literature, a few key examples are explored in depth as vehicles for discussing fundamental concepts, analytical techniques, and evolutionary theory.

The Oxford Handbook of Evolution, Biology, and Society-Rosemary Hopcroft 2018 Evolution, biology, and society is a catch-all phrase encompassing any scholarly work that utilizes evolutionary theory and/or biological or behavioral genetic methods in the study of the human social group, and The Oxford Handbook of Evolution, Biology, and Society contains an much needed overview of research in the area by sociologists and other social scientists. The examined topics cover a wide variety of issues, including the origins of social solidarity; religious beliefs; sex differences; gender inequality; determinants of human happiness; the nature of social stratification and inequality and its effects; identity, status, and other group processes; race, ethnicity, and race discrimination; fertility and family processes; crime and deviance; and cultural and social change. The scholars whose work is presented in this volume come from a variety of disciplines in addition to sociology, including psychology, political science, and criminology. Yet, as the essays in this volume demonstrate, the potential of theory and methods from biology for illuminating social phenomena is clear, and sociologists stand to gain from learning more about them and using them in their own work. The theory focuses on evolution by natural selection, the primary paradigm of the biological sciences, while the methods include the statistical analyses sociologists are familiar with, as well as other methods that they may not be familiar with, such as behavioral genetic methods, methods for including genetic factors in statistical analyses, gene-wide association studies, candidate gene studies, and methods for testing levels of hormones and other biochemicals in blood and saliva and including these factors in analyses. This work will be of interest to any sociologist with an interest in exploring the interaction of biological and sociological processes. As an introduction to the field it is useful for teaching upper-level or graduate students in sociology or a related social science.

Evolutionary Pathways in Nature-John C. Avise 2006-05-04 Reconstructing phylogenetic trees from DNA sequences has become a popular exercise in many branches of biology, and here the well-known geneticist John Avise explains why. Molecular phylogenies provide a genealogical backdrop for interpreting the evolutionary histories of many other types of biological traits (anatomical, behavioral, ecological, physiological, biochemical and even geographical). Guiding readers on a natural history tour along dozens of evolutionary pathways, the author describes how creatures ranging from microbes to elephants came to possess their current phenotypes. Essential reading for college students, professional biologists and anyone interested in natural history and biodiversity, this book is packed with fascinating examples of evolutionary puzzles from across the animal kingdom; how the toucan got its enormous bill, how reptiles grow back lost limbs and why Arctic fish don't freeze.

Hemoglobin-Jay F. Storz 2018-11-29 The primary aim of this book is to provide a synthesis of our current understanding of hemoglobin function and

evolution, and to illustrate how research on one particular family of proteins has provided general insights into mechanisms of protein evolution and biochemical adaptation. In doing so, it will also promote an appreciation of how mechanistic insights into protein function can enrich our understanding of how evolution works. Reciprocally, it highlights how approaches in evolutionary genetics (such as phylogenetic comparative methods and ancestral sequence reconstruction) can be brought to bear on questions about the functional evolution of proteins. This treatise on the functional evolution of hemoglobin illustrates how research on a single, well-chosen model system can enhance our investigative acuity and bring key conceptual questions into especially sharp focus.

Handbook of Research Methods and Applications in Comparative Policy Analysis-B. Guy Peters 2020-04-24 Public policy research has become increasingly comparative over the past several decades, but the methodological issues involved in this research have not been discussed adequately. This Handbook provides a discussion of the fundamental methodological issues in comparative policy research, as well as descriptions and analyses of major techniques used for that research. The techniques discussed are both quantitative and qualitative, and all are embedded in the broader discussion of comparative research design.

Phylogenetic Patterns and the Evolutionary Process-Niles Eldredge 1980

Evolutionary Phonology-Juliette Blevins 2004-07-22 Evolutionary Phonology is a theory of sound patterns which synthesizes results in historical linguistics, phonetics and phonological theory. In this book, Juliette Blevins explores the nature of sounds patterns and sound change in human language over the past 7000–8000 years, the time depth for which the comparative method is reasonably reliable. This book presents an approach to the problem of how genetically unrelated languages, from families as far apart as Native American, Australian Aboriginal, Austronesian and Indo-European, can often show similar sound patterns, and also tackles the converse problem of why there are notable exceptions to most of the patterns that are often regarded as universal tendencies or constraints. It argues that in both cases, a formal model of sound change that integrates phonetic variation and patterns of misperception can account for attested sound systems without reference to markedness or naturalness within the synchronic grammar.

Evolutionary Biology—A Transdisciplinary Approach-Pierre Pontarotti 2020-10-29 This book includes 16 selected contributions presented at the 23rd Evolutionary Biology Meeting, which took place in Marseille in September 2019. The annual Evolutionary Biology Meetings in Marseille serve to gather leading evolutionary biologists and other scientists using evolutionary biology concepts, e.g. for medical research. The aim of these meetings is to promote the exchange of ideas to encourage interdisciplinary collaborations. Offering an up-to-date overview of recent findings in the field of evolutionary biology, this book is an invaluable source of information for scientists, teachers and advanced students.

Bayesian Evolutionary Analysis with BEAST-Alexei J. Drummond 2015-08-06 Covers theory, practice and programming in Bayesian phylogenetics with BEAST. The why, how and what of BEAST 2.

Origins of Mind-Liz Swan 2012-12-22 The big question of how and why mindedness evolved necessitates collaborative, multidisciplinary investigation. Biosemiotics provides a new conceptual space that attracts a multitude of thinkers in the biological and cognitive sciences and the humanities who recognize continuity in the biosphere from the simplest to the most complex organisms, and who are united in the project of trying to account for even language and human consciousness in this comprehensive picture of life. The young interdiscipline of biosemiotics has so far by and large focused on codes, signs and sign processes in the microworld—a fact that reflects the field’s strong representation in microbiology and embryology. What philosophers of mind and cognitive scientists can contribute to the growing interdiscipline are insights into how the biosemiotic weltanschauung applies to complex organisms like humans where such signs and sign processes constitute human society and culture.

Dog Behaviour, Evolution, and Cognition-Adam Miklosi 2015 A comprehensive update to the first monograph on dog behaviour, evolution and cognition.
The Theory of Evolution-Samuel M. Scheiner 2020-01-07 Darwin’s nineteenth-century writings laid the foundations for modern studies of evolution, and theoretical developments in the mid-twentieth century fostered the Modern Synthesis. Since that time, a great deal of new biological knowledge has been generated, including details of the genetic code, lateral gene transfer, and developmental constraints. Our improved understanding of these and many other phenomena have been working their way into evolutionary theory, changing it and improving its correspondence with evolution in nature. And while the study of evolution is thriving both as a basic science to understand the world and in its applications in agriculture, medicine, and public health, the broad scope of evolution—operating across genes, whole organisms, clades, and ecosystems—presents a significant challenge for researchers seeking to integrate abundant new data and content into a general theory of evolution. This book gives us that framework and synthesis for the twenty-first century. The Theory of Evolution presents a series of chapters by experts seeking this integration by addressing the current state of affairs across numerous fields within evolutionary biology, ranging from biogeography to multilevel selection, speciation, and macroevolutionary theory. By presenting current syntheses of evolution’s theoretical foundations and their growth in light of new datasets and analyses, this collection will enhance future research and understanding.
The Oxford Handbook of Comparative Evolutionary Psychology-Jennifer Vonk 2012-02-13 This volume brings together leading experts in comparative and evolutionary psychology. Top scholars summarize the histories and possible futures of their disciplines, and the contribution of each to illuminating the evolutionary forces that give rise to unique abilities in distantly and closely related species.
Understanding Human Evolution-Jeffrey K. McKee 2015-10-16 For the one-term course in human evolution, paleoanthropology, or fossil hominins taught at the junior/senior level in departments of anthropology or biology. This new edition provides a comprehensive overview to the field of paleoanthropology–the study of human evolution by analyzing fossil remains. It includes the latest fossil finds, attempts to place humans into the context of geological and biological change on the planet, and presents current controversies in an even-handed manner.
Reflections on language evolution-Cedric Boeckx This essay reflects on the fact that as we learn more about the biological underpinnings of our language faculty, the dominant evolutionary narrative coming out of the linguistic tradition most explicitly oriented towards biology ("biolinguistics") appears increasingly implausible. This text offers ways of opening up linguistic inquiry and fostering interdisciplinarity, taking advantage of new opportunities to provide quantitative, testable hypotheses concerning the complex evolutionary path that led to the modern human language faculty. The essay is structured around three main themes: (i) renewed appreciation for the comparative method applied to cognitive questions, leading to the identification of elementary but fundamental abstractions in non-linguistic species relevant to language; (ii) awareness of the conceptual gaps between disciplines, and the need to carefully link genotype and phenotype without bypassing any "intermediate" levels of description (certainly not the brain); and (iii) adoption of a "philosophical" outlook that puts the complexity of biological entities front and center.
Bryozoan Paleobiology-Paul D. Taylor 2020-09-15 Bryozoa are among the most abundant yet least understood of phyla in the fossil record. These exclusively colonial animals can be traced back to the Ordovician as fossils and are common elements of sediments deposited in shallow marine environments. On occasion their calcareous skeletons are sufficiently numerous to produce bryozoan limestones. The potential of bryozoans in facies analysis, and their use in macroevolutionary studies, have both been widely recognised, but to date have been incompletely exploited. Bryozoan Paleobiology brings together the scattered research on living and fossil bryozoans in broad and profusely illustrated overview that will help students and researchers alike in understanding this fascinating group of animals. Beginning with the basics of bryozoan morphology, ecology and

classification, the book progresses from the smallest scale of skeletal ultrastructure, to the largest of bryozoan distributions in time and space. On the way, topics such as the origin of zooidal polymorphism and macroevolutionary trends in colony forms are covered. Case studies illuminate these topics, and areas in which further research is particularly required are highlighted.

The New Evolutionary Sociology-Jonathan H. Turner 2018-03-09 For decades, evolutionary analysis was overlooked or altogether ignored by sociologists. Fears and biases persisted nearly a century after Auguste Comte gave the discipline its name, as did concerns that its effect would only reduce sociology to another discipline – whether biology, psychology, or economics. Worse, apprehension that the application of evolutionary theory would encourage heightened perceptions of racism, sexism, ethnocentrism and reductionism pervaded. Turner and Machalek argue instead for a new embrace of biology and evolutionary analysis. Sociology, from its very beginnings in the early 19th century, has always been concerned with the study of evolution, particularly the transformation of societies from simple to ever-more complex forms. By comprehensively reviewing the original ways that sociologists applied evolutionary theory and examining the recent renewal and expansion of these early approaches, the authors confront the challenges posed by biology, neuroscience, and psychology to distinct evolutionary approaches within sociology. They emerge with key theoretical and methodological discoveries that demonstrate the critical – and compelling – case for a dramatically enriched sociology that incorporates all forms of comparative evolutionary analysis to its canon and study of sociocultural phenomena.

Structure, Evidence, and Heuristic-Armin W. Schulz 2020-04-22 This book is the first systematic treatment of the philosophy of science underlying evolutionary economics. It does not advocate an evolutionary approach towards economics, but rather assesses the epistemic value of appealing to evolutionary biology in economics more generally. The author divides work in evolutionary economics into three distinct, albeit related, forms: a structural form, an evidential form, and a heuristic form. He then analyzes five examples of work in evolutionary economics falling under these three forms. For the structural form, he examines the parallelism between natural selection and economic decision making, and the parallelism between natural selection and market competition. For the evidential form, he looks at the relationship between animal and human economic decision making, and the evolutionary explanation of diversity in human economic decision making. Finally, for the heuristic form, he focuses on the plausibility of equilibrium modeling in evolutionary ecology and economics. In this way, he shows that linking evolutionary biology and economics can make for a powerful methodological tool that can enable progress in our understanding of various economics questions. Structure, Evidence, and Heuristic will be of interest to scholars and advanced students working in philosophy of science, philosophy of social science, evolutionary biology, and economics.

Debating Darwin-Robert J. Richards 2016-09-10 Two evolutionists debate the intellectual roots of Darwin’s theories, drawing connections to German Romanticism, the Scottish Enlightenment, and more. Charles Darwin is an icon of modern science, and his theory of evolution is commonly referenced by scientists and nonscientists alike. Yet there is a surprising amount we don’t know about the father of modern evolutionary thinking, his intellectual roots, or even the science he produced. Debating Darwin brings together two leading Darwin scholars—Robert J. Richards and Michael Ruse—to engage in a spirited and insightful dialogue, offering their interpretations of Darwin and their critiques of each other’s thinking. Examining key disagreements about Darwin that continue to confound even committed Darwinists, Richards and Ruse offer divergent views on the man and his ideas. Ruse argues that Darwin was quintessentially British, part of an intellectual lineage tracing back to the Industrial Revolution and thinkers such as Adam Smith and Thomas Robert Malthus. Ruse sees Darwin’s work in biology as an extension of their theories. In contrast, Richards presents Darwin as more cosmopolitan, influenced as much by French and German thinkers. Above all, argues Richards, it was Alexander von Humboldt who gave Darwin the conceptual tools he needed to formulate his evolutionary hypotheses. Together, the authors show how these contrasting views on Darwin’s influences can be felt in theories about the nature of natural selection, the role of metaphor in science, and the place of God in Darwin’s

thought. The book concludes with a jointly authored chapter that brings this debate into the present, focusing on human evolution, consciousness, religion, and morality.

Foundations of Macroecology-Felisa A. Smith 2014-08-22 Macroecology is an approach to science that emphasizes description and explanation of patterns and processes at large spatial and temporal scales. Some liken it to seeing the forest through the trees, an apt ecological use of the proverbial phrase. The term itself was introduced to modern literature by our authors James Brown and Brian Maurer, in a seminal science paper in 1989. We then published books by both of these authors, including Brown s Macroecology in 1995, which quickly traveled to the shelf of classics in ecology, credited with cohering and inspiring a subfield of ecology proper.While macroecology is to many a modern subfield, the large-scale perspective it advocates is implicit in earlier publications. For example, in 1898 de Liocourt studied the influence of management practices on the structure of French fir forests, and characterized the distribution of tree size in three different stands. His findings that in natural areas the number of trees declined exponentially with increasing diameter of the trunk allowed him to draw conclusions about the influence of management practices on tree distribution patterns. Similarly, other classic macroecological patterns including the species-area relationship, latitudinal gradient of species richness, relationship between body size and metabolic rate, species-abundance distribution, and species-body size distribution were identified decades, sometimes even centuries ago. Consequently, despite the scant twenty years that has elapsed since the term was coined, macroecology has a deep and rich history."Foundations of Macroecology" traces and coheres that history, charting an evolutionary trajectory to the rigorous macroecological research landscape science enjoys today. The forty-six papers span eight decades, from 1920 to 1998, and include divergent perspectives of space, time, and taxonomic and habitat affiliation. They are organized into two main parts: Macroecology before Macroecology and Dimensions of Macroecology. The latter is further subdivided into six sections reflecting the subject matter: Allometry and Body Size, Evolutionary Dynamics, Abundance and Distributions, Species Diversity, and Methodological Advances. For each reprinted paper, a macroecologist specializing in that area has written original commentary that places the paper in a broader context and explains why it is foundational. "

Body by Darwin-Jeremy Taylor 2015-10-22 The natural world is rich with elegant evolutionary designs, but ask any patient who wakes daily with sciatica, or the many septuagenarians in need of cataract surgery, not to mention any woman who has given birth, and evolution might seem more dismal than divine. The human body is a wonderful example of evolutionary compromise and adaptations. Our eyes were not designed for the arc of our current lifespan, with upright walking the spine had to shift and years of gravitational pull then take their toll. And the sheer size of our heads coupled with the shape of a woman's pelvis make birth the biological equivalent of a Rube Goldberg machine, with many extra moving parts just to make sure the basics can be done. While the human body may not be as elegant in form and function as those of other species, when explored from an evolutionary perspective, human medicine can be wonderfully illuminated. And this Darwinian view of body function and failure can in turn lead to innovative treatment and health care. This book takes some of the most fascinating and acute medical issues today--from high rate of autoimmune diseases to the high number of heart transplants needed--and explores them through an evolutionary prism. Evolutionary medicine prescribes new tools for understanding the origins of diseases and new kinds of research on possible treatments, of exactly the sort that this book so vividly describes.

Variation-Benedikt Hallgrímsson 2011-05-04 Darwin's theory of evolution by natural selection was based on the observation that there is variation between individuals within the same species. This fundamental observation is a central concept in evolutionary biology. However, variation is only rarely treated directly. It has remained peripheral to the study of mechanisms of evolutionary change. The explosion of knowledge in genetics, developmental biology, and the ongoing synthesis of evolutionary and developmental biology has made it possible for us to study the factors that

limit, enhance, or structure variation at the level of an animals' physical appearance and behavior. Knowledge of the significance of variability is crucial to this emerging synthesis. Variation situates the role of variability within this broad framework, bringing variation back to the center of the evolutionary stage. Provides an overview of current thinking on variation in evolutionary biology, functional morphology, and evolutionary developmental biology Written by a team of leading scholars specializing on the study of variation Reviews of statistical analysis of variation by leading authorities Key chapters focus on the role of the study of phenotypic variation for evolutionary, developmental, and post-genomic biology
Comparative Psychology-Mauricio R Papini 2020-10-21 This revised third edition provides an up to date, comprehensive overview of the field of comparative psychology, integrating both evolutionary and developmental studies of brain and behavior. This book provides a unique combination of areas normally covered independently to satisfy the requirements of comparative psychology courses. Papini ensures thorough coverage of topics like the fundamentals of neural function, the cognitive and associative capacities of animals, the development of the central nervous system and behavior, and the fossil record of animals including human ancestors. This text includes many examples drawn from the study of human behavior, highlighting general and basic principles that apply broadly to the animal kingdom. New topics introduced in this edition include genetics, epigenetics, neurobiological, and cognitive advances made in recent years into this evolutionary-developmental framework. An essential textbook for upper level undergraduate and graduate courses in comparative psychology, animal behavior, and evolutionary psychology, developmental psychology, neuroscience and behavioral biology.
Evolutionary Genomics-Maria Anisimova 2016-05-01 This book examines developments in statistical methodology and the challenges that followed rapidly improving sequencing technologies.Includes articles encompassing theoretical works and hands-on tutorials, as well as many reviews with key biological insight."
Philosophy of Biology-Michael Ruse 1989
From Embryology to Evo-devo-Professor of Theoretical Biology and History of Biology Affiliated Professor of Philosophy Manfred D Laubichler 2007 Historians, philosophers, sociologists, and biologists explore the history of the idea that embryological development and evolution are linked.
Phylogeny, Ecology, and Behavior-Daniel R. Brooks 1991 "The merits of this work are many. A rigorous integration of phylogenetic hypotheses into studies of adaptation, adaptive radiation, and coevolution is absolutely necessary and can change dramatically our collective 'gestalt' about much in evolutionary biology. The authors advance and illustrate this thesis beautifully. The writing is often lucid, the examples are plentiful and diverse, and the juxtaposition of examples from different biological systems argues forcefully for the validity of the thesis. Many new insights are offered here, and the work is usually accessible to both the practiced phylogeneticist and the naive ecologist."—Joseph Travis, Florida State University "[Phylogeny, Ecology, and Behavior] presents its arguments forcefully and cogently, with ample . . .support. Brooks and McLennan conclude as they began, with the comment that evolution is a result, not a process, and that it is the result of an interaction of a variety of processes, environmental and historical. Evolutionary explanations must consider all these components, else they are incomplete. As Darwin's explanations of descent with modification integrated genealogical and ecological information, so must workers now incorporate historical and nonhistorical, and biological and nonbiological, processes in their evolutionary perspective."—Marvalee H. Wake, Bioscience "This book is well-written and thought-provoking, and should be read by those of us who do not routinely turn to phylogenetic analysis when investigating adaptation, evolutionary ecology and co-evolution."—Mark R. MacNair, Journal of Natural History

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