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KEY=EVOLUTION - GRAHAM BROOKLYN

Wild Immunology—The Answers Are Out There

Frontiers Media SA “Go into partnership with nature; she does more than half the work and asks none of the fee.” - Martin H. Fisher. Nature has undertaken an immense amount of work throughout evolution. The evolutionary process has provided a power of information that can address key questions such as - Which immune molecules and pathways are conserved across species? Which molecules and pathways are exploited by pathogens to cause disease? What methods can be broadly used or readily adapted for wild immunology? How does co-infection and exposure to a dynamic environment affect immunity? Section 1 addresses these questions through an evolutionary approach. Laboratory mice have been instrumental in dissecting the nuances of the immune system. The first paper investigates the immunology of wild mice and reviews how evolution and ecology sculpt differences in the immune responses of wild mice and laboratory mice. A better understanding of wild immunology is required and sets the scene for the subsequent papers. Although nature doesn't ask for a fee, it is appropriate that nature is repaid in one form or another. The translational theme of the second section incorporates papers that translate wild immunology back to nature. But any non-human, non-laboratory mouse research environment is hindered by a lack of research tools, hence the underlying theme throughout the second section. Physiological resource allocation is carefully balanced according to the most important needs of the body. Tissue homeostasis can involve trade-offs between energy requirements of the host and compensatory mechanisms to respond to infection. The third section comprises a collection of papers that employ novel strategies to understand how the immune system is compensated under challenging physiological situations. Technology has provided substantial advances in understanding the immune system at cellular and molecular levels. The specificity of these tools (e.g. monoclonal antibodies) often limits the study to a specific species or strain. A consequence of similar genetic sequences or cross-reactivity is that the technology can be adapted to wild species. Section 4 provides two examples of probing wild immunology by adapting technology developed for laboratory species.

Improbable Destinies

Fate, Chance, and the Future of Evolution

Penguin A major new book overturning our assumptions about how evolution works Earth's natural history is full of fascinating instances of convergence: phenomena like eyes and wings and tree-climbing lizards that have evolved independently, multiple times. But evolutionary biologists also point out many examples of contingency, cases where the tiniest change—a random mutation or an ancient butterfly sneeze—caused evolution to take a completely different course. What role does each force really play in the constantly changing natural world? Are the plants and animals that exist today, and we humans ourselves, inevitabilities or evolutionary flukes? And what does that say about life on other planets? Jonathan Losos reveals what the latest breakthroughs in evolutionary biology can tell us about one of the greatest ongoing debates in science. He takes us around the globe to meet the researchers who are solving the deepest mysteries of life on Earth through their work in experimental evolutionary science. Losos himself is one of the leaders in this exciting new field, and he illustrates how experiments with guppies, fruit flies, bacteria, foxes, and field mice, along with his own work with anole lizards on Caribbean islands, are rewinding

the tape of life to reveal just how rapid and predictable evolution can be. *Improbable Destinies* will change the way we think and talk about evolution. Losos's insights into natural selection and evolutionary change have far-reaching applications for protecting ecosystems, securing our food supply, and fighting off harmful viruses and bacteria. This compelling narrative offers a new understanding of ourselves and our role in the natural world and the cosmos.

The Making of the Fittest: DNA and the Ultimate Forensic Record of Evolution

W. W. Norton & Company A geneticist discusses the role of DNA in the evolution of life on Earth, explaining how an analysis of DNA reveals a complete record of the events that have shaped each species and how it provides evidence of the validity of the theory of evolution.

Encyclopedia of Psychology

This volume covers Encyclopedia of Psychology entries from Taine, Hippolyte to Zubin, Joseph. (PsycINFO Database Record (c) 2004 APA, all rights reserved)

Biology of the Three-Spined Stickleback

CRC Press Highlighting the growing importance of the sticklebacks as a model species in emerging fields such as molecular genetics, genomics, and environmental toxicology, *Biology of the Three-Spined Stickleback* examines data from researchers who use studies of the stickleback to address a wide range of biological issues. This state-of-the-art volume

Discover

Eco-evolutionary Dynamics

Princeton University Press In recent years, scientists have realized that evolution can occur on timescales much shorter than the 'long lapse of ages' emphasized by Darwin - in fact, evolutionary change is occurring all around us all the time. This work provides an authoritative and accessible introduction to eco-evolutionary dynamics, a cutting-edge new field that seeks to unify evolution and ecology into a common conceptual framework focusing on rapid and dynamic environmental and evolutionary change.

A Functional Biology of Sticklebacks

Springer Science & Business Media General Editor: Peter Calow, Department of Zoology, University of Sheffield, England The main aim of this series will be to illustrate and to explain the way organisms 'make a living' in nature. At the heart of this - their functional biology - is the way organisms acquire and then make use of resources in metabolism, movement, growth, reproduction, and so on. These processes will form the fundamental framework of all the books in the series. Each book will concentrate on a particular taxon (species, family, class or even phylum) and will bring together information on the form, physiology, ecology and evolutionary biology of the group. The aim will be not only to describe how organisms work, but also to consider why they have come to work in that way. By concentrating on taxa which are well known, it is hoped that the series will not only illustrate the success of selection, but also show the constraints imposed upon it by the physiological, morphological and developmental limitations of the groups. Another important feature of the series will be its organismic orientation. Each book will emphasise the importance of functional integration in the day-to-day lives and the evolution of organisms. This is crucial since, though it may be true that organisms can be considered as collections of gene-determined traits, they nevertheless interact with their environment as integrated wholes and it is in this context that individual traits have been subjected to natural selection and have evolved.

Water and Biomolecules

Physical Chemistry of Life Phenomena

Springer Science & Business Media Life is produced by the interplay of water and biomolecules. This book deals with the physicochemical aspects of such life phenomena produced by water and biomolecules, and addresses topics including "Protein Dynamics and Functions", "Protein and DNA Folding", and "Protein Amyloidosis". All sections have been written by internationally recognized front-line researchers. The idea for this book was born at the 5th International Symposium "Water and Biomolecules", held in Nara city, Japan, in 2008.

PISA Take the Test Sample Questions from OECD's PISA Assessments

Sample Questions from OECD's PISA Assessments

OECD Publishing This book presents all the publicly available questions from the PISA surveys. Some of these questions were used in the PISA 2000, 2003 and 2006 surveys and others were used in developing and trying out the assessment.

Adaptation and Natural Selection

A Critique of Some Current Evolutionary Thought

Princeton University Press Biological evolution is a fact—but the many conflicting theories of evolution remain controversial even today. When *Adaptation and Natural Selection* was first published in 1966, it struck a powerful blow against those who argued for the concept of group selection—the idea that evolution acts to select entire species rather than individuals. Williams's famous work in favor of simple Darwinism over group selection has become a classic of science literature, valued for its thorough and convincing argument and its relevance to many fields outside of biology. Now with a new foreword by Richard Dawkins, *Adaptation and Natural Selection* is an essential text for understanding the nature of scientific debate.

Darwin's Unfinished Symphony

How Culture Made the Human Mind

Princeton University Press Humans possess an extraordinary capacity for culture, from the arts and language to science and technology. But how did the human mind—and the uniquely human ability to devise and transmit culture—evolve from its roots in animal behavior? *Darwin's Unfinished Symphony* presents a captivating new theory of human cognitive evolution. This compelling and accessible book reveals how culture is not just the magnificent end product of an evolutionary process that produced a species unlike all others—it is also the key driving force behind that process. Kevin Laland tells the story of the painstaking fieldwork, the key experiments, the false leads, and the stunning scientific breakthroughs that led to this new understanding of how culture transformed human evolution. It is the story of how Darwin's intellectual descendants picked up where he left off and took up the challenge of providing a scientific account of the evolution of the human mind.

Lizards in an Evolutionary Tree

Ecology and Adaptive Radiation of Anoles

Univ of California Press "In a book both beautifully illustrated and deeply informative, Jonathan Losos, a leader in evolutionary ecology, celebrates and analyzes the diversity of the natural world that the fascinating anoline lizards epitomize. Readers who are drawn to nature by its beauty or its intellectual challenges—or both—will find his book rewarding."—Douglas J. Futuyma, State University of New York, Stony Brook "This book is destined to become a classic. It is scholarly, informative, stimulating, and highly readable, and will inspire a generation of students."—Peter R. Grant, author of *How and Why Species Multiply: The Radiation of Darwin's Finches* "Anoline lizards experienced a spectacular adaptive radiation in the dynamic landscape of the Caribbean islands. The radiation has extended over a long period of time and has featured separate radiations on the larger islands. Losos, the leading active student of these lizards, presents an integrated and synthetic overview, summarizing the enormous and multidimensional research literature. This engaging book makes a wonderful example of an adaptive radiation accessible to all, and the lavish illustrations, especially the photographs, make the anoles come alive in one's mind."—David Wake, University of California, Berkeley "This magnificent book is a celebration and synthesis of one of the most eventful adaptive radiations known. With disarming prose and personal narrative Jonathan Losos shows how an obsession, beginning at age ten, became a methodology and a research plan that, together with studies by colleagues and predecessors, culminated in many of the principles we now regard as true about the origins and maintenance of biodiversity. This work combines rigorous analysis and glorious natural history in a unique volume that stands with books by the Grants on Darwin's finches among the most informed and engaging accounts ever written on the evolution of a group of organisms in nature."—Dolph Schluter, author of *The Ecology of Adaptive Radiation*

Tree Thinking

An Introduction to Phylogenetic Biology

Roberts & Company Baum and Smith, both professors evolutionary biology and researchers in the field of systematics, present this highly accessible introduction to phylogenetics and its importance in modern biology. Ever since Darwin, the evolutionary histories of organisms have been portrayed in the form of branching trees or "phylogenies." However, the broad significance of the phylogenetic trees has come to be appreciated only quite recently. Phylogenetics has myriad applications in biology, from discovering the features present in ancestral organisms, to finding the sources of invasive species and infectious diseases, to identifying our closest living (and extinct) hominid relatives. Taking a conceptual approach, *Tree Thinking* introduces readers to the interpretation of phylogenetic trees, how these trees can be reconstructed, and how they can be used to answer biological questions. Examples and vivid metaphors are incorporated throughout, and each chapter concludes with a set of problems, valuable for both students and teachers. *Tree Thinking* is must-have textbook for any student seeking a solid foundation in this fundamental area of evolutionary biology.

Barron's AP Biology

Simon and Schuster Barron's AP Biology is one of the most popular test preparation guides around and a "must-have" manual for success on the Biology AP Test. In this updated book, test takers will find: Two full-length exams that follow the content and style of the new AP exam All test questions answered and explained An extensive review covering all AP test topics Hundreds of additional multiple-choice and free-response practice questions with answer explanations This manual can be purchased alone, or with an optional CD-ROM that includes two additional practice tests with answers and automatic scoring

The Evolution of Animal Communication: Reliability and Deception in Signaling Systems

Reliability and Deception in Signaling Systems

Princeton University Press **Gull chicks beg for food from their parents. Peacocks spread their tails to attract potential mates. Meerkats alert family members of the approach of predators. But are these--and other animals--sometimes dishonest? That's what William Searcy and Stephen Nowicki ask in *The Evolution of Animal Communication*. They take on the fascinating yet perplexing question of the dependability of animal signaling systems. The book probes such phenomena as the begging of nesting birds, alarm calls in squirrels and primates, carotenoid coloration in fish and birds, the calls of frogs and toads, and weapon displays in crustaceans. Do these signals convey accurate information about the signaler, its future behavior, or its environment? Or do they mislead receivers in a way that benefits the signaler? For example, is the begging chick really hungry as its cries indicate or is it lobbying to get more food than its brothers and sisters? Searcy and Nowicki take on these and other questions by developing clear definitions of key issues, by reviewing the most relevant empirical data and game theory models available, and by asking how well theory matches data. They find that animal communication is largely reliable--but that this basic reliability also allows the clever deceiver to flourish. Well researched and clearly written, their book provides new insight into animal communication, behavior, and evolution.**

Cliffsnotes AP Biology 2021 Exam

Cliffs Notes **CliffsNotes AP Biology 2021 Exam gives you exactly what you need to score a 5 on the exam: concise chapter reviews on every AP Biology subject, in-depth laboratory investigations, and full-length model practice exams to prepare you for the May 2021 exam. Revised to even better reflect the new AP Biology exam, this test-prep guide includes updated content tailored to the May 2021 exam. Features of the guide focus on what AP Biology test-takers need to score high on the exam: Reviews of all subject areas In-depth coverage of the all-important laboratory investigations Two full-length model practice AP Biology exams Every review chapter includes review questions and answers to pinpoint problem areas.**

Preparing for the Biology AP Exam

Benjamin Cummings **Key Benefit: Fred and Theresa Holtzclaw bring over 40 years of AP Biology teaching experience to this student manual. Drawing on their rich experience as readers and faculty consultants to the College Board and their participation on the AP Test Development Committee, the Holtzclaws have designed their resource to help your students prepare for the AP Exam. * Completely revised to match the new 8th edition of *Biology* by Campbell and Reece. * New Must Know sections in each chapter focus student attention on major concepts. * Study tips, information organization ideas and misconception warnings are interwoven throughout. * New section reviewing the 12 required AP labs. * Sample practice exams. * The secret to success on the AP Biology exam is to understand what you must know--and these experienced AP teachers will guide your students toward top scores! Market Description: Intended for those interested in AP Biology.**

The Diversity of Fishes

Biology, Evolution, and Ecology

John Wiley & Sons **The second edition of *The Diversity of Fishes* represents a major revision of the world's most widely adopted ichthyology textbook. Expanded and updated, the second edition is illustrated throughout with striking color photographs depicting the spectacular evolutionary adaptations of the most ecologically and taxonomically diverse vertebrate group. The text incorporates the latest advances in the biology of fishes, covering taxonomy, anatomy, physiology, biogeography, ecology, and behavior. A new chapter**

on genetics and molecular ecology of fishes has been added, and conservation is emphasized throughout. Hundreds of new and redrawn illustrations augment readable text, and every chapter has been revised to reflect the discoveries and greater understanding achieved during the past decade. Written by a team of internationally-recognized authorities, the first edition of *The Diversity of Fishes* was received with enthusiasm and praise, and incorporated into ichthyology and fish biology classes around the globe, at both undergraduate and postgraduate levels. The second edition is a substantial update of an already classic reference and text. Companion resources site This book is accompanied by a resources site: www.wiley.com/go/helfman The site is being constantly updated by the author team and provides:

- Related videos selected by the authors
- Updates to the book since publication
- Instructor resources
- A chance to send in feedback

Phenotypic Plasticity

Functional and Conceptual Approaches

Oxford University Press on Demand Genetic, evolution, adaptation, environment, genotype.

The Analysis of Biological Data

Macmillan Higher Education *The Analysis of Biological Data* provides students with a practical foundation of statistics for biology students. Every chapter has several biological or medical examples of key concepts, and each example is prefaced by a substantial description of the biological setting. The emphasis on real and interesting examples carries into the problem sets where students have dozens of practice problems based on real data. The third edition features over 200 new examples and problems. These include new calculation practice problems, which guide the student step by step through the methods, and a greater number of examples and topics come from medical and human health research. Every chapter has been carefully edited for even greater clarity and ease of use. All the data sets, R scripts for all worked examples in the book, as well as many other teaching resources, are available to qualified instructors (see below).

Handbook of Fish Biology and Fisheries

Fish Biology

John Wiley & Sons Recent decades have witnessed strong declines in fish stocks around the globe, amid growing concerns about the impact of fisheries on marine and freshwater biodiversity. Fisheries biologists and managers are therefore increasingly asking about aspects of ecology, behaviour, evolution and biodiversity that were traditionally studied by people working in very separate fields. This has highlighted the need to work more closely together, in order to help ensure future success both in management and conservation. The *Handbook of Fish Biology and Fisheries* has been written by an international team of scientists and practitioners, to provide an overview of the biology of freshwater and marine fish species together with the science that supports fisheries management and conservation. This volume, subtitled *Fish Biology*, reviews a broad variety of topics from evolutionary relationships and global biogeography to physiology, recruitment, life histories, genetics, foraging behaviour, reproductive behaviour and community ecology. The second volume, subtitled *Fisheries*, uses much of this information in a wide-ranging review of fisheries biology, including methods of capture, marketing, economics, stock assessment, forecasting, ecosystem impacts and conservation. Together, these books present the state of the art in our understanding of fish biology and fisheries and will serve as valuable references for undergraduates and graduates looking for a comprehensive source on a wide variety of topics in fisheries science. They will also be useful to researchers who need up-to-date reviews of topics that impinge on their fields, and decision makers who need to appreciate the scientific background for management and conservation of aquatic ecosystems. To order volume I, go to the box in the top right hand corner. Alternatively to order volume II, go to: <http://www.blackwellpublishing.com/book.asp?ref=063206482X> or to order the 2 volume set, go to: <http://www.blackwellpublishing.com/book.asp?ref=0632064838>. Provides a unique overview of the study of fish biology and ecology, and the assessment and management of fish populations and ecosystems. The first volume concentrates on aspects of fish biology and ecology, both at the individual and population levels, whilst the second volume addresses the assessment and management of fish populations and ecosystems. Written by an international team of expert scientists and practitioners. An invaluable reference tool

for both students, researchers and practitioners working in the fields of fish biology and fisheries.

The Cambridge Handbook of Evolutionary Perspectives on Human Behavior

Cambridge University Press The transformative wave of Darwinian insight continues to expand throughout the human sciences. While still centered on evolution-focused fields such as evolutionary psychology, ethology, and human behavioral ecology, this insight has also influenced cognitive science, neuroscience, feminist discourse, sociocultural anthropology, media studies, and clinical psychology. This handbook's goal is to amplify the wave by bringing together world-leading experts to provide a comprehensive and up-to-date overview of evolution-oriented and influenced fields. While evolutionary psychology remains at the core of the collection, it also covers the history, current standing, debates, and future directions of the panoply of fields entering the Darwinian fold. As such, The Cambridge Handbook of Evolutionary Perspectives on Human Behavior is a valuable reference not just for evolutionary psychologists but also for scholars and students from many fields who wish to see how the evolutionary perspective is relevant to their own work.

The Evolution of Language

Cambridge University Press Language, more than anything else, is what makes us human. It appears that no communication system of equivalent power exists elsewhere in the animal kingdom. Any normal human child will learn a language based on rather sparse data in the surrounding world, while even the brightest chimpanzee, exposed to the same environment, will not. Why not? How, and why, did language evolve in our species and not in others? Since Darwin's theory of evolution, questions about the origin of language have generated a rapidly-growing scientific literature, stretched across a number of disciplines, much of it directed at specialist audiences. The diversity of perspectives - from linguistics, anthropology, speech science, genetics, neuroscience and evolutionary biology - can be bewildering. Tecumseh Fitch cuts through this vast literature, bringing together its most important insights to explore one of the biggest unsolved puzzles of human history.

Evolution For Dummies

John Wiley & Sons

The Biology of Parasites

John Wiley & Sons This heavily illustrated text teaches parasitology from a biological perspective. It combines classical descriptive biology of parasites with modern cell and molecular biology approaches, and also addresses parasite evolution and ecology. Parasites found in mammals, non-mammalian vertebrates, and invertebrates are systematically treated, incorporating the latest knowledge about their cell and molecular biology. In doing so, it greatly extends classical parasitology textbooks and prepares the reader for a career in basic and applied parasitology.

The Cambridge Handbook of Animal Cognition

Cambridge University Press "Divided into six sections - communication and language, memory and recall, social cognition, social learning and teaching, numerical and quantitative abilities, and innovation and problem solving the Handbook allows readers to focus specifically on what they are interested in. Concise overviews in each section provide the history and basic concepts in each area, and are helpful for both newcomers to the field or specialists seeking to gain background in different areas. Each overview is followed by three to six entries for readers who are interested in learning more about a particular subject"--

On the Origin of Species Illustrated

On the Origin of Species (or, more completely, On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life), published on 24 November 1859, is a work of scientific literature by Charles Darwin which is considered to be the foundation of evolutionary biology. Darwin's book introduced the scientific

theory that populations evolve over the course of generations through a process of natural selection. It presented a body of evidence that the diversity of life arose by common descent through a branching pattern of evolution. Darwin included evidence that he had gathered on the Beagle expedition in the 1830s and his subsequent findings from research, correspondence, and experimentation.

The Biology of the Sticklebacks

Uncovering Student Ideas in Science: 25 formative assessment probes

NSTA Press Using probes as diagnostic tools that identify and analyze students' preconceptions, teachers can easily move students from where they are in their current thinking to where they need to be to achieve scientific understanding.

Why Evolution is True

OUP Oxford For all the discussion in the media about creationism and 'Intelligent Design', virtually nothing has been said about the evidence in question - the evidence for evolution by natural selection. Yet, as this succinct and important book shows, that evidence is vast, varied, and magnificent, and drawn from many disparate fields of science. The very latest research is uncovering a stream of evidence revealing evolution in action - from the actual observation of a species splitting into two, to new fossil discoveries, to the deciphering of the evidence stored in our genome. *Why Evolution is True* weaves together the many threads of modern work in genetics, palaeontology, geology, molecular biology, anatomy, and development to demonstrate the 'indelible stamp' of the processes first proposed by Darwin. It is a crisp, lucid, and accessible statement that will leave no one with an open mind in any doubt about the truth of evolution.

Fish Nutrition

Elsevier *Fish Nutrition* aims to present the state of knowledge of basic and applied nutritional requirements of fishes. Most of the information found in this book involves salmonids, their nutrition, and metabolism of nutrients. This is in view of the fact that more research has been done and completed with this fish. Although applied fish nutrition is a very broad field, this book focuses on some of its aspects. These include the classes of nutrients and requirements for several types of fishes. This book comprises of 11 chapters. The first few chapters deal with the general nutrient requirements of fishes. Then, other chapters discuss calorie and energy as well as micro- and macronutrient needs and requirements. The following chapters deal with the non-nutrient components of the diet, or those that influence the characteristics of food products including texture, odor, flavor, and color. Other topics covered are enzymes and systems of intermediary metabolism (Chapter 6); feed formulation and evaluation (Chapter 7); and salmonid husbandry techniques (Chapter 9). Nutritional fish diseases are also discussed in this book. Some of these diseases include thyroid tumor, gill disease, anemia, lipid liver degeneration, and visceral granuloma. In Chapter 11, the relationship of nutrition and pathology is given emphasis. This chapter also tackles the diet and general fish husbandry. This topic is very important, because an adequate diet for fish husbandry is the foundation of fish farming.

Escaping From Predators

An Integrative View of Escape Decisions

Cambridge University Press When a predator attacks, prey are faced with a series of 'if', 'when' and 'how' escape decisions - these critical questions are the foci of this book. Cooper and Blumstein bring together a balance of theory and empirical research to summarise over fifty years of scattered research and benchmark current thinking in the rapidly expanding literature on the behavioural ecology of escaping. The book consolidates current and new behaviour models with taxonomically divided empirical chapters that demonstrate the application of escape theory to different groups. The chapters integrate behaviour with physiology, genetics and evolution to lead the reader through the complex

decisions faced by prey during a predator attack, examining how these decisions interact with life history and individual variation. The chapter on best practice field methodology and the ideas for future research presented throughout, ensure this volume is practical as well as informative.

Honeybee Democracy

Princeton University Press Honeybees make decisions collectively--and democratically. Every year, faced with the life-or-death problem of choosing and traveling to a new home, honeybees stake everything on a process that includes collective fact-finding, vigorous debate, and consensus building. In fact, as world-renowned animal behaviorist Thomas Seeley reveals, these incredible insects have much to teach us when it comes to collective wisdom and effective decision making. A remarkable and richly illustrated account of scientific discovery, *Honeybee Democracy* brings together, for the first time, decades of Seeley's pioneering research to tell the amazing story of house hunting and democratic debate among the honeybees. In the late spring and early summer, as a bee colony becomes overcrowded, a third of the hive stays behind and rears a new queen, while a swarm of thousands departs with the old queen to produce a daughter colony. Seeley describes how these bees evaluate potential nest sites, advertise their discoveries to one another, engage in open deliberation, choose a final site, and navigate together--as a swirling cloud of bees--to their new home. Seeley investigates how evolution has honed the decision-making methods of honeybees over millions of years, and he considers similarities between the ways that bee swarms and primate brains process information. He concludes that what works well for bees can also work well for people: any decision-making group should consist of individuals with shared interests and mutual respect, a leader's influence should be minimized, debate should be relied upon, diverse solutions should be sought, and the majority should be counted on for a dependable resolution. An impressive exploration of animal behavior, *Honeybee Democracy* shows that decision-making groups, whether honeybee or human, can be smarter than even the smartest individuals in them.

The Timetree of Life

OUP Oxford The evolutionary history of life includes two primary components: phylogeny and timescale. Phylogeny refers to the branching order (relationships) of species or other taxa within a group and is crucial for understanding the inheritance of traits and for erecting classifications. However, a timescale is equally important because it provides a way to compare phylogeny directly with the evolution of other organisms and with planetary history such as geology, climate, extraterrestrial impacts, and other features. *The Timetree of Life* is the first reference book to synthesize the wealth of information relating to the temporal component of phylogenetic trees. In the past, biologists have relied exclusively upon the fossil record to infer an evolutionary timescale. However, recent revolutionary advances in molecular biology have made it possible to not only estimate the relationships of many groups of organisms, but also to estimate their times of divergence with molecular clocks. The routine estimation and utilization of these so-called 'time-trees' could add exciting new dimensions to biology including enhanced opportunities to integrate large molecular data sets with fossil and biogeographic evidence (and thereby foster greater communication between molecular and traditional systematists). They could help estimate not only ancestral character states but also evolutionary rates in numerous categories of organismal phenotype; establish more reliable associations between causal historical processes and biological outcomes; develop a universally standardized scheme for biological classifications; and generally promote novel avenues of thought in many arenas of comparative evolutionary biology. This authoritative reference work brings together, for the first time, experts on all major groups of organisms to assemble a timetree of life. The result is a comprehensive resource on evolutionary history which will be an indispensable reference for scientists, educators, and students in the life sciences, earth sciences, and molecular biology. For each major group of organism, a representative is illustrated and a timetree of families and higher taxonomic groups is shown. Basic aspects of the evolutionary history of the group, the fossil record, and competing hypotheses of relationships are discussed. Details of the divergence times are presented for each node in the timetree, and primary literature references are included. The book is complemented by an online database (www.timetree.net) which allows researchers to both deposit and retrieve data.

Ecology

The Experimental Analysis of Distribution and Abundance

Addison-Wesley **Part 1: What is ecology?** Chapter 1: Introduction to the science of ecology. Chapter 2: Evolution and ecology. **Part 2: The problem of distribution: populations.** Chapter 3: Methods for analyzing distributions. Chapter 4: Factors that limit distributions: dispersal. Chapter 5: Factors that limit distributions: habitat selections. Chapter 6: Factors that limit distributions: Interrelations with other species. Chapter 7: Factors that limit distributions: temperature, moisture, and other physical-chemical factors. Chapter 8: The relationship between distribution and abundance. **Part 3: The problem of abundance: populations.** Chapter 9: Population parameters. Chapter 10: Demographic techniques: vital statistics. Chapter 11: Population growth. Chapter 12: Species interactions: competition. Chapter 13: Species interactions: predation. Chapter 14: Species interactions: Herbivory and mutualism. Chapter 15: Species interactions: disease and parasitism. Chapter 16: Population regulation. Chapter 17: Applied problems I: harvesting populations. Chapter 18: Applied problems II: Pest control. Chapter 19: Applied problems III: Conservation biology. **Part 4: Distribution and abundance at the community level.** Chapter 20: The nature of the community. Chapter 21: Community change. Chapter 22: Community organization I: biodiversity. Chapter 23: Community organization II: Predation and competition in equilibrial communities. Chapter 24: Community organization III: disturbance and nonequilibrium communities. Chapter 25: Ecosystem metabolism I: primary production. Chapter 26: Ecosystem metabolism II: secondary production. Chapter 27: Ecosystem metabolism III: nutrient cycles. Chapter 28: Ecosystem health: human impacts.

Simutext

Phenotypic Plasticity & Evolution

Causes, Consequences, Controversies

CRC Press **Phenotypic plasticity - the ability of an individual organism to alter its features in direct response to a change in its environment - is ubiquitous. Understanding how and why this phenomenon exists is crucial because it unites all levels of biological inquiry. This book brings together researchers who approach plasticity from diverse perspectives to explore new ideas and recent findings about the causes and consequences of plasticity. Contributors also discuss such controversial topics as how plasticity shapes ecological and evolutionary processes; whether specific plastic responses can be passed to offspring; and whether plasticity has left an important imprint on the history of life. Importantly, each chapter highlights key questions for future research. Drawing on numerous studies of plasticity in natural populations of plants and animals, this book aims to foster greater appreciation for this important, but frequently misunderstood phenomenon. Key Features** Written in an accessible style with numerous illustrations, including many in color **Reviews** the history of the study of plasticity, including Darwin's views **Most chapters conclude with recommendations for future research**

The New York Times Index

Homology, Genes, and Evolutionary Innovation

Princeton University Press **A major synthesis of homology, written by a top researcher in the field** Homology—a similar trait shared by different species and derived from common ancestry, such as a seal's fin and a bird's wing—is one of the most fundamental yet challenging concepts in evolutionary biology. This groundbreaking book provides the first mechanistically based theory of what homology is and how it arises in evolution. Günter Wagner, one of the preeminent researchers in the field, argues that homology, or character identity, can be explained through the historical continuity of character identity networks—that is, the gene regulatory networks that enable differential gene expression. He shows how character identity is independent of the form and function of the character itself because the same network can activate different effector genes and thus control the development of different shapes, sizes, and qualities of the character. Demonstrating how this theoretical model can provide a foundation for understanding the evolutionary origin of novel characters, Wagner applies it to the origin and evolution of specific systems, such as cell types; skin, hair, and feathers; limbs and digits; and flowers. The first major

synthesis of homology to be published in decades, Homology, Genes, and Evolutionary Innovation reveals how a mechanistically based theory can serve as a unifying concept for any branch of science concerned with the structure and development of organisms, and how it can help explain major transitions in evolution and broad patterns of biological diversity.