



PREFACE

This text introduces the field of biological anthropology (also known as physical anthropology), the science concerned with human biological evolution and variation. The text addresses the major questions that concern biological anthropologists: What are humans? How are we similar to and different from other animals? Where are our origins? How did we evolve? Are we still evolving? How are we different from one another? and What does the future hold for the human species?

ORGANIZATION

This book is divided into four parts. Part I, “Evolutionary Background,” provides the basic background in genetics and evolutionary theory used throughout the remainder of the text. Chapter 1 introduces the science of biological anthropology, the nature of science, and the history of evolutionary thought. Chapter 2 reviews molecular and Mendelian genetics as applied to humans, providing genetic background for later chapters and including a basic review of cell biology for those whose high school biology is a bit rusty. Chapter 3 focuses on evolutionary forces, the mechanisms that produce evolutionary change within and between populations. Chapter 4 looks at evolution over longer periods of time, focusing on the origin of new species, and includes discussion on how species are classified.

Part II, “Our Place in Nature,” examines the biology and behavior of the primates, the group of mammals to which humans belong. The focus of this section is on two questions: What are humans? and How are we related to other living creatures? Chapter 5 looks at the basic biology and behavior of mammals in general and primates in particular. Chapter 6 examines the diversity of primate biology and behavior, with particular attention given to

our close relatives, the apes. Chapter 7 looks specifically at the human species and includes a comparison of human traits with those of apes.

Part III deals with questions of “Our Origins.” Chapter 8 begins with discussion of the methods of paleoanthropology and concludes with a brief history of life on earth prior to the appearance of the first primates. Chapter 9 examines the fossil and genetic evidence for primate evolution from the appearance of the primate-like mammals through the split of ape and human lines by 6 million years ago. Chapter 10 deals with the beginning of human evolution, focusing on the fossil evidence for the first hominins and the evolution of bipedalism. Chapter 11 examines the origin and biological and cultural evolution of the genus *Homo*, including early *Homo*, *Homo erectus*, *Homo heidelbergensis*, and the Neandertals. Chapter 12 looks at the fossil, archaeological, and genetic evidence for the origin of modern humans and includes a discussion of current controversies.

Part IV, “Our Diversity,” examines human biological variation in our species today from an evolutionary perspective. Chapter 13 focuses on the measurement and analysis of human variation, and contrasts evolutionary and racial approaches to human diversity. Chapter 14 provides several case studies of how information on genetic variation is used to address questions of population history and individual ancestry. Chapter 15 reviews a number of case studies of natural selection in human populations. Chapter 16 continues examining human variation from the broad perspective of human adaptation, both biological and cultural. Chapter 17 concludes the text by examining recent human evolution (over the past 12,000 years), focusing on the biological impact of culture change, with particular emphasis on changing patterns of disease, mortality, fertility, and population growth.

The organization of this text reflects my own teaching preference in terms of topics and sequence. Not all instructors will use the same sequence of chapters; some may prefer a different arrangement of topics. I have attempted to write chapters in such a way as to accommodate such changes whenever possible. For example, although I prefer to discuss human evolution before human variation, others prefer the reverse, and the chapters have been written and revised so that this alternative organizational structure can be used.

FEATURES

Throughout the text, I have attempted to provide new material relevant to the field and fresh treatments of traditional material. Key features include the following:

- All areas of contemporary biological anthropology are covered. In addition to traditional coverage of areas such as genetics, evolutionary theory, primate behavior, and the fossil record, the text includes material often neglected in introductory texts, including genetics and population history, human growth, epidemiology, and demography.

- The relationship between biology and culture is a major focus. The biocultural framework is introduced in the first chapter and integrated throughout the text.
- Behavior is discussed in an evolutionary context. The evolutionary nature of primate and human behavior is emphasized in a number of chapters, including those on primate biology and behavior (Chapters 5–7) and the fossil record of human evolution (Chapters 10–12).
- Emphasis is on the human species in its context within the primate order. Discussions of mammals and nonhuman primates continually refer to their potential relevance for understanding the human species. In fact, Chapter 7 is devoted *entirely* to treating our species from a comparative perspective.
- Hypothesis testing is emphasized. From the first chapter, in which students are introduced to the scientific method, I emphasize how various hypotheses are tested. Rather than provide a dogmatic approach with all the “right” answers, the text examines evidence in the context of hypothesis testing. With this emphasis, readers can see how new data can lead to changes in basic models and can better understand the “big picture” of biological anthropology.

NEW TO THIS EDITION

The text has been revised in light of new findings in the field and comments from users of the sixth edition and reviewers. Specific changes include the following:

- Several changes have been made in structure and chapter content. The chapters on human variation have been placed together and now appear after the chapters on human evolution, thus forming a more logical sequence of topics in human evolutionary history from past through the present. The discussion of species and classification methods has been moved to the chapter on macroevolution (4).
- The chapter on mammalian and primate biology and behavior (5) has been revised extensively to include material on life history theory, primate reproductive strategies, alloparenting, and dispersal and behavior.
- A new chapter (8) has been added on methods of paleoanthropological research, including dating methods, methods of ecological and behavioral analysis from fossils, and a brief history of evolution before the appearance of the first primates. This chapter also includes new material on how sex and age are determined from fossils, stable isotope analysis, experimental archaeology, and the use of nonhuman primate models for reconstructing behavior.
- The term *hominin* is now used throughout the text to refer to humans and their relatives since the time of divergence from the chimpanzee–bonobo line.

- The chapters on the fossil record of human evolution have been rewritten extensively to increase clarity and provide data on new discoveries and interpretations, including the virtual reconstruction of *Sabellanthropus*, foraging and the origin of bipedalism, debates over hunting versus scavenging in *Homo erectus*, the expensive tissue hypothesis, discovery of “the Hobbit” (*Homo floresiensis*), the increasing recognition of *Homo heidelbergensis* as a valid fossil species, and the extraction of nuclear DNA from a Neandertal fossil.
- Additional new topics have been added throughout the remainder of the text, including discussion of uniformitarianism and geologic time, recent developments in the “intelligent design” movement, new research on natural selection in the Duffy blood group and the *CCR5Δ32* allele, and new interpretations on nutrition in hunting-gathering societies, among others.
- There are four new “Special Topic” boxes, dealing with the issues of “Humans and Apes—What Genes Are Different?” (Chapter 7), “A Perspective on Geologic Time” (Chapter 8), “Our Common Ancestry” (Chapter 14), and “Are Humans Still Experiencing Natural Selection?” (Chapter 15).

STUDY AIDS

To make the text more accessible and interesting, I have included frequent examples and illustrations of basic ideas, as well as abundant maps, to help orient students. I have kept the technical jargon to a minimum, yet every introductory text contains a number of specialized terms that students must learn. At first mention in the text, these terms appear in boldface type, and accompanying short definitions appear in the text margins. A glossary is provided at the end of the book. Each chapter ends with a summary, a list of supplemental readings, and a list of Virtual Explorations, which provide hands-on exercises and activities for real-time applications of text material. Several appendices provide additional reference material, including a primer on mathematical population genetics and figures showing comparative primate anatomy. A list of references appears at the end of the book, providing the complete reference for studies cited in the text.

ANCILLARIES

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For Instructors

The password-protected instructor portion of the website includes the instructor's manual, a comprehensive computerized test bank, PowerPoint lecture slides, and a variety of additional instructor resources.

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Last, but not least, I dedicate this as always to my family. To my wonderful sons, David, Benjamin, and Zane—thanks for all the smiles and hugs, which make it all worthwhile. Thanks also for all those questions that really make me think (the ones I couldn't answer as well as those I could). Finally, to my wife, Hollie, love of my life and my best friend—thanks for the love, friendship, and support. I couldn't have done this without you.