



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 book. Chapter 1 provides a general introduction to 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 the evolutionary forces, the mechanisms that produce evolutionary change within populations. Chapter 4 looks at evolution over longer periods of time, focusing on the origin of new species, and includes a brief review of the history of life on our planet.

Part II, “Human Biological Variation,” examines biological variation in our species today from an evolutionary perspective. Chapter 5 focuses on the measurement and analysis of human variation. Chapter 6 provides several case studies of how information on genetic variation is used to address questions of population history and individual ancestry. Chapter 7 reviews a

number of case studies of natural selection in human populations. Chapter 8 continues examining human variation from the broad perspective of human adaptation, both biological and cultural.

Part III, “Our Place in Nature,” examines the biology, behavior, and evolution of the primates, the group of mammals to which humans belong. A main focus of this section are the questions “What are humans?” and “How are we related to other living creatures?” Chapter 9 examines issues in classification and looks at the basic biology and behavior of mammals in general, and primates in particular. Chapter 10 looks at the different types of primates in terms of classification, biology, and behavior, with particular attention given to our close relatives, the apes. Chapter 11 looks specifically at the human species and includes a comparison of human traits with those of apes. Chapter 12 provides some background on the analysis of the fossil record and summarizes the major events of primate origins and evolution, from the time of the disappearance of the dinosaurs 65 million years ago to the split of ape and human lines roughly 6 million years ago.

Part IV deals with “Human Evolution” in both a biological and a cultural sense. Chapter 13 begins with a brief review of human evolutionary history and follows with a detailed summary of the earliest hominids and the origin of bipedalism. Chapter 14 examines the origin and biological and cultural evolution of the genus *Homo*. Chapter 15 looks at the fossil, archaeological, and genetic evidence for the origin of modern humans and includes a discussion of current controversies (Did modern humans evolve throughout the world, or are our recent ancestors exclusively from Africa?). Chapter 16 examines recent human evolution (over the past 12,000 years) and focuses 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 for four units arranged in the same 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. Although I prefer to discuss human variation before the fossil record of human evolution, 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 9–11) and the fossil record of human evolution (Chapters 13–15).
- 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 11 is devoted entirely to treating our species from a comparative perspective.
- Hypothesis testing is emphasized. From the first chapter, where 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 fifth edition. Specific changes include the following:

- More detail on measures of human variation has been added to Chapter 5. This chapter also now includes a section on global patterns of human genetic variation and their analysis, providing a contrast with “racial” approaches to the study of human diversity.
- The chapter on microevolution has been expanded and split into two separate chapters. Chapter 6 examines how information on genetic variation can be used to reconstruct population history. This chapter also shows how genetic data can be used to reveal aspects of the genetic ancestry of individuals and the contrast between genetic ancestry and cultural identity. Chapter 7 focuses exclusively on case studies of natural selection in human populations.
- Discussion of the fossil record has been revised to reflect new finds, including those of *Carpolestes* and *Dryopithecus*, as well as the new taxon *Sahelanthropus*. The discussion of the fossil record includes the new *Homo erectus* cranium from Dmanisi and the new nearly modern crania from Africa dating to 160,000 years ago. In addition, the section on modern human origins has been rewritten to focus on the current debate over the fate of the non-African archaics—replacement or assimilation?

- A number of new topics have been added, including forensic anthropology, the genetics of depression, the HLA system, racial classification in forensics, isolation by distance, Kennewick Man, the *CCR5* gene and natural selection, culture change and natural selection, debate over Boas's cranial studies of plasticity, and the evolution of human childbirth.

STUDY HELPS

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. The first mention of these terms in the text appears in boldface type and accompanying short definitions appear in the text margins. A glossary is provided at the end of the book, often with more detailed definitions.

Each chapter ends with a summary, a list of supplemental readings, and a new feature entitled Virtual Explorations, which provides 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, a list of primate species, and a short review of 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

The Instructor's Manual includes a test bank of more than 700 multiple-choice questions, as well as sample essay questions, chapter overviews and outlines, topics for class discussion, and sources for laboratory equipment. A Computerized Test Bank is available free of charge to qualifying adopters. Also available to qualifying adopters is a package of 80 color and black-and-white transparency acetates. In addition, an Online Learning Center is available to both instructors and students at www.mhhe.com/relethford6.

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