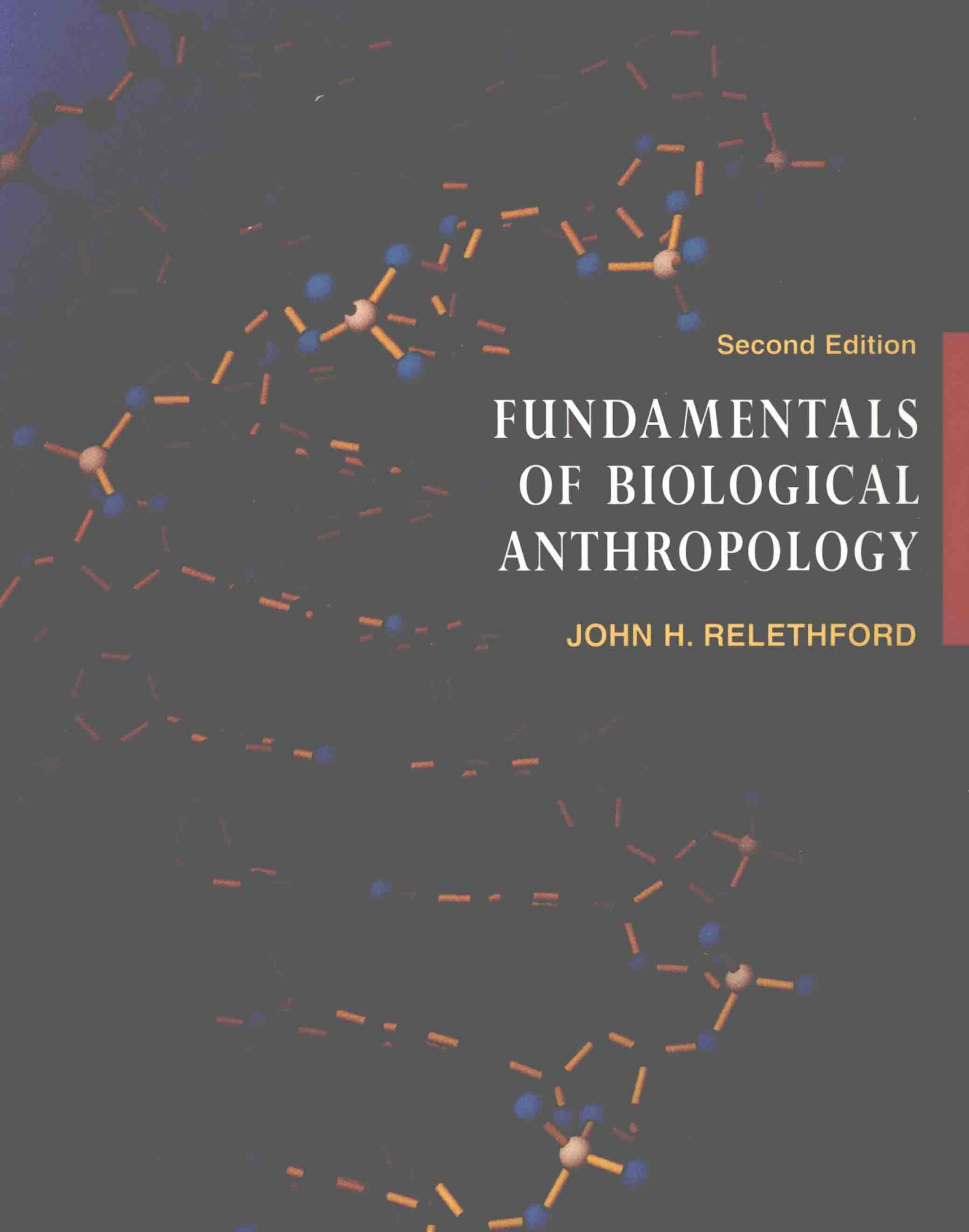
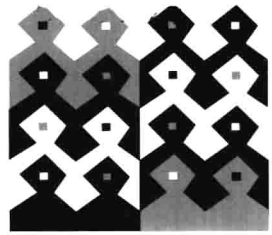


Second Edition

FUNDAMENTALS OF BIOLOGICAL ANTHROPOLOGY

JOHN H. RELETHFORD



SECOND EDITION

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Preface

This text is an abridged and slightly rewritten version of the third edition of *The Human Species: An Introduction to Biological Anthropology.* Why a brief version of another textbook? No single textbook can accommodate perfectly all the different ways in which an introductory course in biological/physical anthropology is taught. Instructors vary in terms of their interests, use of supplemental materials, and allotted time for their courses. This text will serve several audiences for which the larger version might not be as appropriate. First, a shorter text may be more useful for those teaching on a quarter system. Second, some instructors like to assign supplemental readings, and a shorter text suits this arrangement. Third, some instructors prefer texts with less detail than traditional introductory texts; this text fills that need. Finally, the shorter length of this text makes it suitable as one of several texts for courses such as a basic introduction to anthropology or a combined physical anthropology and archaeology course.

This text introduces the field of biological anthropology (also known as physical anthropology), the science concerned with human biological origins, 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

The book is divided into four parts. Part One, "Evolutionary Background," gives readers the grounding they will need in genetics and evolutionary theory to better understand the remainder of the text. Chapter 1 begins with an overview of anthropology and biological anthropology and discusses the scientific method as it relates to evolution. A brief history of evolutionary science and a discussion of the "creation-evolution" debate conclude the chapter.

Chapter 2 reviews molecular and Mendelian genetics as applied to humans in order to provide genetic background for later chapters. It includes a basic review of cell biology. Chapter 3 covers microevolution and macroevolution.

Part Two addresses "Our Place in Nature," specifically the biology, behavior, and evolution of primates. A main focus of this section is the questions "What are humans?" and "How are we related to other living creatures?" Chapter 4 examines issues in classification and looks at the basic biology and behavior of mammals in general, and primates in particular. This chapter also evaluates the different types of primates in terms of classification, biology, and behavior, with particular attention given to our close relatives, the apes. Chapter 5 looks specifically at the human species and includes a comparison of human traits with those of apes. Chapter 6 examines the fossil record for evolution, looking at dating methods and other techniques of fossil analysis and includes a brief summary of the evolution of life prior to the origin of primates. Chapter 6 concludes with an overview of 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 5–7 million years ago.

Part Three devotes three chapters to "Human Evolution." Chapter 7 begins with a brief review of human evolutionary history and follows with a detailed summary of the first hominids, the australopithecines, and the emergence of the genus *Homo* characterized by a larger brain and the advent of stone tool technology. Chapter 8 examines the continued biological and cultural evolution of the genus *Homo*. Chapter 9 looks at the fossil and archaeological 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?).

Part Four focuses on "Human Variation," with an emphasis on understanding how modern peoples differ from one another and why. This section also looks at the way the human species continues to evolve, both biologically and culturally. Chapter 10 examines different ways we measure human variation and contrasts racial and evolutionary approaches to variation. Chapter 11 provides a number of case studies of microevolution and adaptation in modern and recent human populations. Chapter 12 explores the evolution of patterns of human health and disease in our evolutionary past and in today's world, as well as changes in the demographic structure of human populations.

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, some instructors may prefer to cover human variation before the sections on primates and human evolution. In that case, a sequence of Parts One, Four, Two, and Three would work well.

Features

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

- *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, such as human health and disease and demography. In addition, the study of human growth is incorporated into several chapters.
- *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 (4–6) and the fossil record of human evolution (7–9).
- *The emphasis is on the human species in its context within the primate order.* Discussions of mammals and nonhuman primates continually refer back to their potential relevance for understanding the human species. In fact, a separate chapter on the biology and behavior of the human species written from a comparative perspective has been added to this edition.
- *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

Every chapter has been carefully revised in light of new findings in the field and comments from users of the second edition. In fact, a number of chapters have been re-ordered, added, and merged or deleted based on the helpful feedback I received from colleagues. To make the text as clear, accessible, and up-to-date as possible, I've made the following specific changes:

- Each chapter now includes one or more boxes that focuses on a "Special Topic." Some of the topics focus on contemporary issues (for example, "The Coming Plague?"), some on historical issues (for example, "The Piltdown Hoax"), and some on a wide range of other subjects (for example, "Science Fiction and Orthogenesis").

- Chapter 4 is devoted to the variation in the biology and behavior of primates and reviews the entire order, from prosimians to the great apes. Case studies on primate behavior have been added and treatment of the bonobo has been expanded.
- A new chapter (5) has been added that focuses exclusively on the human species. Material on the patterns of human growth and their evolutionary significance has been moved here.
- The chapter on primate evolution (6) has been streamlined and revised to emphasize the major evolutionary trends in primate evolution, underlining the issue of Miocene ape diversity and the way it precludes drawing specific family trees.
- The chapter on the first hominids (7) has been revised to begin with a brief summary of human evolution in order to provide a conceptual framework for the student. Information on new species (*Ardipithecus ramidus* and *Australopithecus anamensis*) has been added, as has new information on dating and anatomy. The section on evolutionary trends has been rewritten to minimize phylogenetic arguments and to emphasize basic questions (for example, "Why did we become bipedal?").
- The chapter on the evolution of the genus *Homo* has been split into two chapters (8 and 9). Chapter 8 now covers *Homo erectus* and "archaic" *Homo sapiens*. New data have been incorporated, including the finding of a possible earlier date for the arrival of *Homo erectus* in Asia. A new Chapter 9 focuses on the origin of modern humans. In addition to a complete revision of the modern human origins debate, this chapter adds new material on modern human archaeology and questions of language origins.
- The chapters on human variation (10–12) have all been placed in a single unit (Part Four). New case studies have been used in Chapter 11 to illustrate human microevolution. The chapter on health and disease and demography (12) has been rewritten to focus on evolutionary issues, and case studies have been revised, added, or deleted to relate to this main point. Material on the secular change in human growth and protein-calorie malnutrition has been moved into Chapter 12.
- The appendix on primate classification has been revised and simplified. Two new appendixes have been added: one on comparative skeletal anatomy and one on metric conversion factors.

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 and a list of supplemental readings. 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 500 questions, as well as 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 68 color and black-and-white transparency acetates.

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My thanks go to the dedicated and hardworking people at Mayfield, both those I have dealt with personally and the others behind the scenes. I give special thanks to Jan Beatty, sponsoring editor, for continued encouragement and support. I am also extremely grateful to Melissa Kreischer, production editor, for her excellence, dedication, and patience. Pam Trainer, permissions editor, and Carol Dondrea, manuscript editor, were also very helpful.

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Last, but not least, I dedicate this to my family: to my wife and best friend, Hollie Jaffe, and to my wonderful sons, David, Benjamin, and Zane. You make it all worthwhile.

Contents

PART ONE

Evolutionary Background