

Preface

How Humans Evolved focuses on the processes that have shaped human evolution. This approach reflects our training and research interests. As anthropologists, we are interested in the evolutionary history of our own species, *Homo sapiens*. As evolutionary biologists, we study how evolution works. In this book, we integrate these two perspectives. We use current theoretical and empirical work in evolutionary theory, population genetics, and behavioral ecology to interpret human evolutionary history. We describe the changes that have occurred as the human lineage has evolved, and we consider why these changes may have happened. We try to give life to the creatures that left the bones and made the artifacts that paleontologists and archaeologists painstakingly excavate, by focusing on the processes that generate change, create adaptations, and shape bodies and behavior. We also pay serious attention to the role of evolution in shaping contemporary human behavior. There is considerable controversy over evolutionary approaches to human behavior within the social sciences, but we think it is essential to confront these issues openly and clearly. Positive responses to the first five editions of *How Humans Evolved* tell us that many of our colleagues endorse this approach.

One of the problems in writing a textbook about human evolution is that there is considerable debate on many topics. Evolutionary biologists disagree about how new species are formed and how they should be classified; primatologists argue about the adaptive significance of infanticide and the effects of dominance rank on reproductive performance; paleontologists disagree about the taxonomic relationships among early hominin species and the emergence of modern humans; and those who study modern humans disagree about the meaning and significance of race, the role of culture in shaping human behavior and psychology, the adaptive significance of many aspects of modern human behavior, and many other things. Sometimes multiple interpretations of the same data can be defended; in other cases, the facts seem contradictory. Textbook writers can confront this kind of uncertainty in two different ways. They can weigh the evidence, present the ideas that best fit the available evidence, and ignore the alternatives. Or they can present opposing ideas, evaluate the logic underlying each idea, and explain how existing data support each of the positions. We chose the second alternative, at the risk of complicating the text and frustrating readers looking for simple answers. We made this choice because we believe that this approach is essential for understanding how science works. Students need to see how theories are developed, how data are accumulated, and how theory and data interact to shape our ideas about how the world works. We hope that students remember this long after they have forgotten many of the facts that they will learn in this book.

New in the Sixth Edition

The study of human evolution is a dynamic field. No sooner do we complete one edition of this book than researchers make new discoveries that fundamentally change our view of human evolution. These kinds of discoveries include the spectacular fossil finds that reveal new chapters in human ancestry, new data that alter our interpretation of the behavioral strategies of primates, and experimental studies that reveal cross-cultural regularities in mating preferences. New developments in human evolutionary studies require regular updates of the textbook. Although we have made a number of changes

throughout the book to reflect new findings, clarify concepts, and improve the flow of the text, readers familiar with prior editions will find the most substantive changes in Part Two, "Primate Ecology and Behavior," and Part Three, "The History of the Human Lineage."

In Part Two, we made a number of changes to Chapter 5, which introduces readers to the primate order. First, we shifted from a cladistic taxonomy to an evolutionary taxonomy, and now group the tarsiers in the suborder Haplorrhini along with the monkeys and apes. Second, we provided a more complete introduction to the diversity of living primate species. Third, we extended and updated our discussion of primate conservation.

Nearly all the chapters in Part Three have been extensively revised. In Chapter 9, we added a description of the newly discovered Eocene primate, *Darwinius masilae*, and thoroughly revised our discussion of the Miocene apes, adding descriptions of several late Miocene apes, and concluding with a discussion of the diversity of the locomotor adaptations of the Miocene hominoids. This material provides a useful foundation for interpreting the newly published trove of information about *Ardipithecus ramidus*, which receives greatly expanded coverage in Chapter 10. In Chapter 10, we also describe new discoveries from Woranso-Mille in Ethiopia which are relevant to understanding the relationship between *Au. anamensis* and *Au. afarensis*, and introduce the new australopith, *Au. sediba* from South Africa. We have shifted material on *Homo habilis* to Chapter 12. Material on the lives of the australopiths has been folded into Chapter 11, in which we focus on the life history and behavioral adaptations of the Oldowan hominins. Chapter 11 has been revised to incorporate new findings about the antiquity of hominin tool use and the lively debate about the taphonomic evidence for hunting versus scavenging at Olduvai sites. In addition to introducing the earliest members of the genus *Homo* in Chapter 12, we have thoroughly revised the chapter to reflect our growing appreciation of the great complexity of middle Pleistocene hominin evolution. Much of this knowledge is derived from analyses of DNA extracted from fossil specimens, and as molecular genetics comes to play a bigger role in our understanding of human origins, discussion of these techniques come to play a larger role in our story. We discuss the implications of the results of genetic analyses of DNA from Neanderthals and the newly discovered bones from the Denisova cave in Chapters 12 and 13. In Chapter 13, we have also included new material on archaeological discoveries at Blombos Cave and Pinnacle Point that suggest the presence of complex modern behavior in southern African by at least 90 kya.

In Part Four, we added a discussion of how genome-wide association studies have allowed the identification of genes affecting polygenic characters such as stature, and the striking confirmation that such characters are influenced by many genes, each with a small phenotypic effect.

We wrote this book with undergraduates in mind, and have designed a number of features to help students use the book effectively. We have retained the "key idea" statements (now printed in blue type), and we recommend that students use these key ideas to keep track of important concepts and facts, and to structure their reviews of the material. Important terms that may be unfamiliar are set in boldfaced type when they first appear. Readers can find definitions for these terms in the Glossary. Discussion questions appear at the end of each chapter. These questions are meant to help students synthesize material presented in the text. Some of the questions are designed to help students review factual material, but most are intended to help students to think about the processes or theoretical principles they have learned. Some questions are open-ended and meant to encourage students to apply their own values and judgment to the material presented in the text. Students tell us that they find these questions useful as they attempt to master the material and prepare for exams. The list of references for further reading at the end of each chapter provides a starting point for students who want to delve more deeply into the material covered in that chapter.

The book is richly illustrated with photographs, diagrams, figures, and graphs. These illustrations provide visual information to complement the text. For some

subjects, a picture is clearly worth a thousand words—no amount of description can enable students to conjure up an image of an aye-aye or appreciate how much more similar the australopith pelvis is to the modern human pelvis than to the chimpanzee pelvis. The diagrams of evolutionary processes that appear in Part One are designed to help students visualize how natural selection works. The figures depicting the hominin fossils are drawn to scale, so each is presented in the same orientation and to the same scale. This should help students compare one hominin specimen with another. We have often been advised that you cannot put graphs in an undergraduate textbook, but we think that the graphs help students understand the evidence more fully. For us, it is easier to remember data that is portrayed graphically than to recall verbal descriptions of results.

Ancillary Materials for Teaching and Learning

For Instructors

The Norton Physical Anthropology in Action DVD features over 80 film clips from across the discipline with an emphasis on paleoanthropology and primatology. Perfect for classroom use, these videos help students see and think like anthropologists and make it easy for instructors to illustrate key concepts and spark classroom discussion. Each DVD contains a reference booklet with clip descriptions written by Tracy K. Betsinger of the State University of New York, Oneonta.

Instructor's Resource Disc

This visually dynamic Instructor's Resource Disc, authored by Jeremy DeSilva of Boston University, includes:

- PowerPoint slides with a suggested classroom lecture script in the notes field;
- Clicker questions for each chapter ready for classroom incorporation;
- All the art from the text in both PowerPoint and JPEG formats.

Instructor's Manual and Test Bank (by Elizabeth Erhart, Texas State University; updated by Christina Grassi, Skidmore College; with contributions by Tracy Betsinger, SUNY, Oneonta)

The Instructor's Manual provides an overview of each chapter's key concepts with additional explanation for topics that students may find more challenging, as well as answers to the end-of-chapter Study Questions found in the text. The Sixth Edition Instructor's Manual includes a revised suggested video and Web resources list, and activities to accompany the new Physical Anthropology in Action DVD. Available in print paperback and for download.

The Test Bank offers teachers over 90 multiple-choice, true/false, and essay questions (organized by difficulty level and topic) for each chapter. New to the edition are new questions in every chapter, knowledge types and page references for every question, and sample answers to the essay questions. Available in print paperback, Exam View Assessment Suite (CD-ROM and downloadable), and for download as a PDF and Word file.

Coursepacks

Available at no cost to professors or students, Norton coursepacks for online or hybrid courses are available in a variety of formats, including all versions of Blackboard and WebCT. With just a simple download from our instructor's Web site, instructors can bring high-quality Norton digital media into a new or existing online course (no extra student passwords required), and it's theirs to keep forever. Content includes

chapter-based assignments, test banks and quizzes, interactive learning tools, and all content from the StudySpace Web site.

Visit www.norton.com/instructors to download the instructor's resources.

For Students

StudySpace: Your Place for a Better Grade www.norton.com/studyspace, authored by Kristina Killgrove, University of North Carolina, Chapel Hill

StudySpace tells students what they know, shows them what they still need to review, and then gives them an organized study plan to master the material. This free and easy-to-navigate Web site offers students an impressive range of exercises, interactive learning tools, assessment, and review materials, all without passwords or hidden costs:

- **NEW! Quiz+ Chapter Review Quizzes** don't just tell students how they did; they show them how they can do better. Quiz+ gives students a targeted study plan that offers specific page references and links to the ebook and other online learning tools. This allows students to instantly access the resources they need, when they need them most.
- **AnthroTours:** Google Earth flyovers of key locations discussed in the book bring the dig to the classroom.
- **Flashcards** for every chapter help students review key concepts before exams. Many of the flashcards will contain images so students can test their knowledge of important fossils.
- **Chapter outlines and new learning objectives** help students organize their study and review.

Ebook and Chapter Select Ebook
Same great book, *one-third* the price.

An affordable and convenient alternative, Norton ebooks retain the content and design of the print book and allow students to highlight and take notes with ease, print chapters as needed, and search the text. With Chapter Select ebooks, instructors can create a custom ebook that contains only the chapters they want to assign. For *How Humans Evolved*, Sixth Edition, chapters cost \$4.

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