

Seventh Edition

# Biological Anthropology



Michael Alan Park



# BIOLOGICAL ANTHROPOLOGY

SEVENTH EDITION

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藏书章





## BIOLOGICAL ANTHROPOLOGY, SEVENTH EDITION

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# PREFACE



Contemporary biological anthropology is a dauntingly broad field. It studies humans in the same way that zoologists study their subject species—from a perspective that includes *all* aspects of the species' biology and that emphasizes the interrelationships among those aspects. In addition to encompassing the traditional topics of the human fossil record and human biological variation, bioanthropology includes primatology, modern technologies in molecular genetics, human demography, disease and medical issues, development of the individual, life histories, and such applications as forensic anthropology. Bioanthropology also appreciates that our cultural behavior is an integral part of our behavior as a species.

No wonder, then, that I (and others I have spoken to) have had difficulty in covering the entire field in a one-semester course. We have ended up leaving out important aspects (or paying them little more than lip service), or we have sacrificed the sense of bioanthropology as an integrated whole for a rushed and encyclopedic inventory of all the field's current topics.

As modern bioanthropology increased in breadth and complexity over the past several decades, so too did the size and detail of introductory texts. Several are now more than 600 pages long. Attempts to produce shorter introductory texts have consisted of simply cutting out parts of these tomes, resulting in rather uneven, sometimes oddly organized, presentations of the field.

I wrote this text in order to present a diverse scientific field to beginning students. Here are the major assumptions that guided my writing:

- Because this is a text for introductory courses, I have tried to reduce the field to its most basic information. No part of the discipline has been left out; instead, I have achieved brevity by managing the level of detail and including only the information necessary to clearly and

accurately convey the basic themes, theories, methods, and facts of bioanthropology.

- The text assumes that students have limited background knowledge of the material and little understanding of what science is and how it works. The text *explains* rather than simply itemizes facts and ideas, and it does so, as much as possible, in a narrative format. A lesson from the study of folklore is that a story is far more easily understood and retained than is a list of facts.
- I want students to feel that they are reading a text written by a real person who has participated in the field. I have tried to achieve a balance between informal and formal styles, and I have not shied away from the occasional colloquialism or personal comment.

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## FEATURES

I've included a number of features that I hope will make this text a more useful learning tool for students.

- *I use the scientific method as a theme throughout the book to demonstrate the integrity and nature of bioanthropology.* I describe the scientific method and then try to show specifically how scientific reasoning has provided us with knowledge about the topics of bioanthropology. For example, I present extended discussions of bipedalism and the issue of modern human origins by posing questions, suggesting answers, and then testing the logic of and evidence for those answers.
- *The text is organized to help students navigate their way through what is still a fairly hefty amount of information.* To help students feel a little less at sea in the midst of new facts and ideas, I regularly refer back to previous topics and ahead to topics that will be covered. The headings and subheadings I use as signposts are as descriptive as possible (for example, "Natural Selection: The Prime Mover of Evolution").
- *Within chapters, a consistent format helps students better understand material new to them.* Each chapter starts with an **introduction**, which sets the stage and context for what's to come, followed by a series of **questions** that the chapter will answer. Because science proceeds by asking and answering questions, this format is also used within the body of the text. A **Contemporary Reflections** box examines a topical application of each chapter's themes and ideas. **Key terms** are



boldfaced in the text and defined in the margins at their first appearance. Each chapter concludes with a list of key terms and a **summary** that not only recaps the important points of the chapter but also provides some new ideas and thoughts that help put the chapter into context within the whole discipline. Also concluding each chapter are **questions for further thought**, which are designed to help students explore the real-world ramifications of the chapter's topics. And a list of **suggested readings**, made up mostly of nontechnical works, tells interested students where to find more information on the material discussed.

- *Two appendixes* discuss in detail the subjects of protein synthesis and population genetics.
- *Two glossaries, a reference list, and a comprehensive index make information more accessible.* A Glossary of Human and Nonhuman Primates, with pronunciations for each term, defines and describes the taxonomic groups discussed in the text. In addition to the running glossary within chapters, a comprehensive Glossary of Terms appears at the back of the book. The References section contains complete sources for the suggested readings and also lists technical works referred to within the text. The Index helps students access information quickly.
- *The text's visual appeal enhances its readability.* Detailed, colorful charts and drawings, as well as full-color photographs, underscore significant points in the text. Captions for the artwork add information rather than simply label the pictures.

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## WHAT'S NEW IN THIS EDITION?

- The biggest change is in further streamlining and condensing the material presented throughout the book. As a result, the book is now fourteen chapters long instead of fifteen. No major topic is left out; I have simply managed the amount and level of detail so that readers can more easily get to and understand the basic concepts. What I have trimmed are the asides and extended introductions, detail that is not referred to again, and qualifications or exceptions that are not built on later in the text. This gives instructors the choice of adding in details as they wish, either in class or in other readings. My hope is that students will then come to class having the essential material well in mind to build upon.

- Throughout the text, I have further increased the number of chapter headings and subheadings to help readers navigate their way through the material. These headings reinforce ease of study by also acting as a built-in outline of the chapters.
- In a field where new discoveries are made on a regular basis, and vital new interpretations appear frequently, I have been careful to provide the most up-to-date information in all the chapters. There are almost thirty new bibliographic references, half of which come from 2011.
- Among the most important specific chapter changes and updates are these:
  - Chapter 3, “Evolutionary Genetics,” reflects new information in that field, including the importance of epigenetics.
  - Chapter 5, “The Origin of Species and the Shape of Evolution” has a new section, “The Grand Pattern of Evolution,” that better explains punctuated equilibrium in its context within an independent theory of macroevolution—in terms beginning students can understand.
  - Chapter 7, “The Primates,” simplifies the concept of cladistic taxonomy and has a new section, “Are We Hominids or Hominins?” in which I explain why I am returning to the model that classifies only humans in family Hominidae.
  - Chapter 10, “Evolution of the Early Hominids,” suffered from a forest-for-the-trees problem. The sections on *Australopithecus* and *Paranthropus* have been condensed to focus on the data at the level of the genus. Details on the individual fossil forms can be added, if desired, by the instructor. I have updated the map and chart to include *A. sediba*.
  - Chapter 11, “The Evolution of Genus *Homo*,” begins with a description of the nature and features of the whole genus. I have condensed detail on the individual proposed species of genus *Homo* and have added a new section about the Denisovans. Most important, I condensed the entirety of previous Chapter 12 on the modern human origins debate into a new section in this chapter, which includes my rationale for the change. I have thoroughly updated the chapter to reflect new finds and dates.
  - Chapter 12, “Evolution and Adaptation in Human Populations,” I have updated data on causes of death and HIV/AIDS. There is a

new Contemporary Reflections box, “Are There Jewish Diseases? Are There Black Pharmaceuticals?”

- Chapter 13, “Human Biological Diversity,” includes a rewritten and updated section on the genetic evidence for the nonexistence of biological races and a new section on “Anthropology and the History of Race Studies.”

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## SUPPLEMENTARY MATERIAL

Visit our Online Learning Center Web site at [www.mhhe.com/parkba7e](http://www.mhhe.com/parkba7e) for a variety of resources.

- Resources for instructors include the Instructor’s Manual, with chapter overviews, suggested activities, and key terms; a Computerized Testing Program with multiple-choice and short-answer/essay questions; and chapter-specific PowerPoint lecture slides.
- Biological anthropology is eminently visual. Available to students and instructors on the Online Learning Center Web site are fossil images that make the course more vivid and interactive, reinforcing concepts and content students learn in the course.

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## ACKNOWLEDGMENTS

Thirty-nine years now since leaving Indiana University, I still feel a profound debt to my first teachers there in bioanthropology, Robert Meier, Paul Jamison, and Georg Neumann. This book, I trust, reflects some of the knowledge and inspiration I received from them.

It was Jan Beatty who first brought me to Mayfield Publishing Company over twenty years ago. She was the sponsoring editor of ten editions of my books before Mayfield joined forces with McGraw-Hill. It is an understatement to say that her knowledge of all aspects of publishing, combined with her understanding of anthropology and the needs (and quirks) of us academic types, has been a major influence on all my written work. Although I consider this book the result of a collaboration of many capable people over the years, it owes its heart (in every way) to Jan.

Thanks to the able staff at McGraw-Hill for once again transforming my ideas and words into an attractive and useful finished product.



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# TO THE READER



The broad field of biological, or physical, anthropology deals with everything from evolutionary theory to the human fossil record to the identification of human skeletal remains from crime scenes and accidents. A detailed account of this whole field would result in an unwieldy text that would be a tough assignment for a one-semester introductory course, especially if it were assigned in its entirety.

This text is intended to truly be an *introduction* to biological anthropology. It will tell you about the many different kinds of studies bioanthropologists participate in and how they conduct them; you'll also learn about the scientific theories and data they use. All the important aspects of bioanthropology are covered here but with just the essential amount of detail. An understanding of the ideas presented in this book will provide you with the basis for delving more deeply into those areas of bioanthropology that interest you.

A major theme of this book is the scientific method. Biological anthropology is a science, so an understanding of how science works is essential. Because the field of anthropology studies the human species in its entirety, however, the text will examine science as a human endeavor, seeing where it fits in the realm of human knowledge.



## HOW TO USE THIS BOOK

Each chapter starts with an **introduction** that sets the stage and context for what's to come, followed by a series of **questions** that the chapter will answer. Because science proceeds by asking and answering questions, this format is also used within the body of the text. **Key terms** are boldfaced and defined in the margins at their first appearance. Each chapter ends

with a **summary** that not only recaps the important points of the chapter but also provides some new ideas and thoughts that help put what you have just learned into the context of the whole discipline of bioanthropology. There are also **questions for further thought** that will help you explore some of the real-world ramifications of the chapter's topics. A list of **suggested readings**, made up mostly of nontechnical works, tells you where to find more information on topics of particular interest.

A Glossary of Human and Nonhuman Primates defines taxonomic (scientific) names for species discussed in the text—names such as *Homo sapiens* and *Australopithecus afarensis*—and tells you how to pronounce them. In addition to the running glossary within chapters, a comprehensive Glossary of Terms appears at the back of the book. The References section contains complete citations for the suggested readings and also lists technical works referred to within the text. The Index will help you more quickly access information.

To help you visualize specific fossils, a wealth of images is available on the Online Learning Center Web site at [www.mhhe.com/parkba7e](http://www.mhhe.com/parkba7e). Physical anthropology is eminently visual and these images can help bring the course alive for you. Exercises that will allow you to apply specific bioanthropological concepts are also available on this Web site.

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## PRACTICAL STUDY TIPS

### Most Importantly: Establish Your Own Style and Stick to It.

What works for one person won't for another. I always needed peace and quiet to study and still do (and I still *take* courses), but I know some of my students like to study while listening to their iPods. A colleague of mine works with CNN on the TV. Some people highlight passages in the text, others make marginal notes, still others write an outline of the material. Of course, you'll have to adjust your study style to the text in question and to your instructor's format, but for the most part, you can do this around your basic approach. Don't be too inflexible, though; try some of the following suggestions. If they work, fine. If not, forget them.

### Read the Text as a Book.

It may sound strange, but this is a book. It is not a Web site on paper nor a guide to using other resources. Very simply, it should be read as a *book*, as you would a novel, for example. I wrote it in a "narrative" style. That is, the contents of the chapters and the order of the chapters themselves are meant to convey a story, whereby one idea leads to the next and each idea



follows from previous ideas. Stories are how humans have shared information since time immemorial. And because this book is structured as a story—a causal sequence of ideas—it is much easier to retain than is a list of facts.

### Don't Highlight Everything.

I've seen some of my students' textbooks with virtually every sentence glowing yellow, pink, or green. This is not helpful, just as it's not helpful to try to write down everything your instructor says in class. Notes and highlighting should be *clues to jog your memory*. Here are two examples—of what not to do and of what would help you actually learn the material:

See the difference?

A Survey of the Living Primates 139

One of the first things you should notice are the new categories here as compared with those shown in Table 7.1. *Suborder, infraorder, and superfamily* have been added between the traditional Linnaean categories of *order* and *family*. (A complete taxonomy of insects, for example, a class with over 750,000 known species, is, as you can well imagine, incredibly complex.)

**Prosimians**

The order Primates is traditionally divided into two major suborders, *Prosimii* and *Anthropoidea*. Prosimians ("pre-apes") represent the most primitive primates, that is, those that most closely resemble the earliest primates. At first widespread, prosimians were pushed into marginal areas as newer, more adaptively flexible primates evolved. Some modern prosimians live on the mainlands of Africa, India, and Southeast Asia and on the isolated islands of Southeast Asia, but the majority inhabit the island of Madagascar (Figure 7.12).

The forty or so living species of prosimians exhibit a number of differences from the general primate pattern. About half of the prosimian species are nocturnal and so lack color vision. They have large eyes that can gather more light, as well as better than average senses of smell and

FIGURE 7.12  
Distribution of living nonhuman primates.

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Distribution of living nonhuman primates.

### Use the Ancillary Material as Support.

The text in the book, with the illustrations and captions, is the main part. The running glossary entries (in the margins), opening questions, material at the ends of chapters, the main glossary, and the Online Learning Center Web site are all there to help you *make sense of and learn* the material in the book. Use all these things to help you define words and test your knowledge of the material, but don't start with them or rely on them. The text I had when I took introductory anthropology had *none* of these things. They are helpful but not necessary.

### Organize Reviewing and Studying for Exams.

For this book, I'd suggest first rereading the opening questions and then the summary for each chapter. These will remind you of the themes of the chapter, the general ideas that the facts are supporting. Then, review your highlights and notes. Finally, see if you can answer the opening questions.

### Ask Questions!

If you miss one idea, you may well miss many ideas that follow from it. Write down questions that occur to you, or make notes in the margins of the book. Then get answers to them as soon as you can. And while it's a cliché, it's true: No question is stupid. Someone else in the class may well have the same question. And if you would like my input, feel free to email me at: [ParkM@ccsu.edu](mailto:ParkM@ccsu.edu).

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