

Introduction to Physical Anthropology

Customized Textbook for M. Leonor Monreal

ROBERT JURMAIN / LYNN KILGORE / WENDA TREVATHAN WITH RUSSELL L. CIOCHON



ELEVENTH EDITION



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Eleventh Edition

Robert Jurmain / Lynn Kilgore / Wenda Trevathan with Russell L.
Ciochon

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Robert Jurmain / Lynn Kilgore / Wenda Trevathan with Russell L. Ciochon

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PREFACE

Welcome to *Introduction to Physical Anthropology*, Eleventh Edition. Eleven editions may seem like a lot of revisions of our book—and it is. Both students and instructors may wonder why so many revisions are required and why new editions appear with regularity.

Consider, however, how fast things change in our culture. How often do any of us have to upgrade our computers, both for new software and hardware? How many of you still listen to cassette players?

Science too changes rapidly, and you may be surprised to learn it can change even more rapidly than many aspects of popular culture, like those we mentioned above. In some areas of scientific research what we knew just last year is now obsolete. So, out go the Walkman®, the old laptop, and last year's textbook.

This physical anthropology textbook is about human biology, most especially from an evolutionary perspective. Since all our main topics are *biological*, many are particularly prone to rapid scientific modification. Everyone is at least partly familiar with the rapid advances in DNA research, now often called “genomics.” New techniques have fueled a massive revolution in all the biological sciences, including physical anthropology. Knowledge is exploding so fast that researchers race to stay up-to-date. Sometimes, what was adequate knowledge last month is now incomplete. While professional journals churn out exciting results, in some cases weekly, textbooks obviously can't keep up with that sort of pace.

Since the last edition of *Introduction to Physical Anthropology* came out, much has changed in our field. For example, at that time the entire pattern of chimpanzee DNA (that is, the chimpanzee genome) was not yet published. Moreover, many of you saw or heard, in the fall of 2004, the announcement in the popular press of the discovery of what have been called “the hobbits,” found on an island in Indonesia. This fascinating discovery of 3-foot-tall, small-brained humans living as recently as 13,000 years ago is the most startling human evolutionary discovery in many decades. Yet, it was not discussed at all in our last edition.

We should also reemphasize some key points related to what this text is about and what we authors are trying to accomplish. As we've said, our approach is grounded in an evolutionary understanding of human beings. In many public schools evolutionary theory is no longer taught, and in others it is handled superficially or, we're sad to say, incorrectly. Moreover, you're all probably aware of wide popular debate regarding evolutionary biology and how it should be taught in public schools. We'll address these issues (in Chapter 2), but from the outset you should recognize how humans fit within the evolutionary development of life on earth. This is the main focus of our book.

What's more, medical and other applications taken directly from the biological sciences will increasingly impact all of us in coming years. Many of you who are taking a course in physical/

biological anthropology are doing so to fulfill a general education life science requirement. As educated and engaged citizens in a 21st-century democracy, it's crucial that you be well informed. The authors (all teachers) have taught introductory physical anthropology as a general education course. Consequently, for all of us another major goal of this text is to provide students with essential tools for understanding scientific information; in this way, you'll be better prepared to deal with the rapidly changing world you'll face in the years ahead.

Because genetic mechanisms lie at the heart of understanding evolution, we'll address basic aspects of life, cells, DNA, and the ways species change in the early chapters (2–5) of this text. We'll next turn (in Chapters 6–8) to an exploration of our evolutionary cousins, the non-human primates and how they relate to us both physically and behaviorally. In Chapter 9, we'll discuss the evolutionary history of early primates in order to better understand the many ways in which primates have adapted to their environments.

More details of our specific human evolutionary history over the past five million years are covered over the next five chapters. We'll begin with our small-brained ancestors in Africa and follow the development of their descendants through time and over their expanding ranges into Asia and Europe—and much later into Australia and the Americas.

In the last section of this book (Chapters 15–17), we'll conclude our coverage of human evolution with a discussion of modern human biology and trace the ongoing evolution of our species. Our major topics will include the nature of human variation (including the meaning of “race”) and patterns of adaptation in recent human populations.

What's New in the Eleventh Edition

For those familiar with earlier editions, the most obvious change you'll note, even from a glance at the cover, is that we have a new coauthor (Russell Ciochon from the University of Iowa). Moreover, we have a new chapter (“Overview of the Fossil Primates”). This new chapter provides an interpretation and concise summary of the evolution of our early primate ancestors from the most primitive prosimians through the emergence of monkeys, apes, and humans. We will trace the roots of our primate cousins, beginning around 65 million years ago, and follow the evolution of their descendants. You'll be able to see how many species have come and gone and discover what can be learned from fossils about the ancestry of the living primates—including us.

As mentioned, we have also updated materials throughout and expanded certain sections to reflect contemporary research. Updates include those discussed above relating to molecular biology and new fossil finds from Indonesia. Other significant new fossil and molecular research is also represented, including the discovery of the earliest modern human fossils from Ethiopia and the first DNA sequencing of early modern humans found in Europe (involving fossils from France, Belgium, Italy, and Russia). Finally, we have updated our coverage of the evolution of human disease, including expanded materials on both AIDS and SARS.

Prior users will also notice many changes to the figures, including new versions of all maps, and the addition of dozens of new photos. As in earlier editions, all of these photos are carefully selected to enhance the material discussed directly in the text. These changes greatly enhance the visual appeal as well as the teaching effectiveness of the presentation.

Since a central goal of our text is to stimulate critical thinking, the **Critical Thinking Questions** at the end of each chapter have been thoroughly revised to emphasize a more critical and intellectually creative approach to incorporating *and* applying knowledge. These components, as well as other new ones and those retained from earlier editions are listed below.

FEATURES

New Frontiers in Research boxes are major between-chapter features highlighting some of the newest and most innovative research in physical anthropology. Four areas of research are covered, including:

- Molecular Applications in Forensic Anthropology (following Chapter 4)
- Molecular Applications in Primatology (following Chapter 8)
- Ancient DNA (following Chapter 12)
- Molecular Applications in Modern Human Biology (following Chapter 16)

Issues are major features found between many chapters. They focus on intriguing topics that have produced debates among the general public as well as among professional anthropologists. Each is written in informal style and challenges readers to think critically about the scientific and moral questions raised.

Boxed highlights titled **A Closer Look** are high-interest features found throughout the book. They expand on the topic under discussion in the chapter by providing a more in-depth perspective.

IN-CHAPTER LEARNING AIDS

- **Chapter outlines** at the beginning of each chapter list all major topics covered.
- **Key Questions** appear at the beginning of each chapter and highlight the central topic of that chapter.
- A **running glossary** in the margins provides definitions of terms immediately adjacent to the text when the term is first introduced. A **full glossary** is provided in the back of the book.
- **At a Glance** boxes are features found throughout the book that briefly summarize complex or controversial material in a visually simple fashion.
- **Figures**, including numerous photographs, line drawings, and maps, most in full color, are carefully selected to clarify text materials and are placed to directly support discussion in the text.
- **Critical Thinking Questions** at the end of each chapter have been completely revised to reinforce key concepts and to encourage students to think critically about what they have read.
- **Full bibliographic citations** throughout the entire book provide sources from which the materials are drawn. This type of documentation guides students to published source materials and illustrates for students the proper use of references. All cited sources are listed in the comprehensive bibliography at the back of the book.
- A “**Click!**” guide at the beginning of each chapter directs students to the appropriate media covering materials pertinent to that chapter. One or more of the three supplemental multimedia products will be listed: *Virtual Laboratories for Physical Anthropology, Fourth Edition*; *Basic Genetics for Anthropology CD-ROM: Principles and Applications*; and *Hominid Fossils CD-ROM: An Interactive Atlas*.



Click!

An example of the Click!
icon in the margins.

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Robert Jurmain
Lynn Kilgore
Wenda Trevathan
Russell Ciochon

SUPPLEMENTS

Introduction to Physical Anthropology comes with an outstanding supplements program to help instructors create an effective learning environment so students can master the latest discoveries and interpretations in the field of physical anthropology.

SUPPLEMENTS FOR INSTRUCTORS

Instructor's Manual and Test Bank This comprehensive manual offers chapter outlines, learning objectives, key terms and concepts, lecture suggestions and enrichment topics as well as 40–60 test questions per chapter.

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by John Kappelman

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Human Environment Interactions by *Cathy Galvin* This module begins with a brief discussion of the history and core concepts of the field of human ecology, before looking in-depth at how the environment influences cultural practices (environmental determinism) and how aspects of culture, in turn, affect the environment. Human Behavioral Ecology is presented within the context of natural selection and how ecological factors influence the development of cultural and behavioral traits and how people subsist in different environments. The module concludes with a discussion of resilience and global change as a result of human-environment interactions.

Molecular Anthropology Module by *Leslie Knapp* This module explores how molecular genetic methods are used to understand the organization and expression of genetic information in humans and nonhuman primates. Students will learn about the common laboratory methods used to study variation and evolution in molecular anthropology. Examples are drawn from up-to-date research on human evolutionary origins and comparative primate genomics to demonstrate that scientific research is an ongoing process with theories frequently being questioned and reevaluated.

Forensic Anthropology Module by *Diane France* This module introduces students to the essentials of forensic anthropology as it is practiced in the United States and Canada. It explores the field's myths and realities of the search for human remains in

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Basic Genetics in Anthropology CD-ROM: Principles and Applications by *Robert Jurmain, Lynn Kilgore and Wenda Trevathan* Available *free* bundled with the text, this CD-ROM helps students to review and more easily comprehend biological inheritance (genes, DNA sequencing, etc.) and its application to modern human populations at the molecular level (human variation and adaptation to disease, diet, growth, and development). Interactive animations and simulations bring these important concepts to life.

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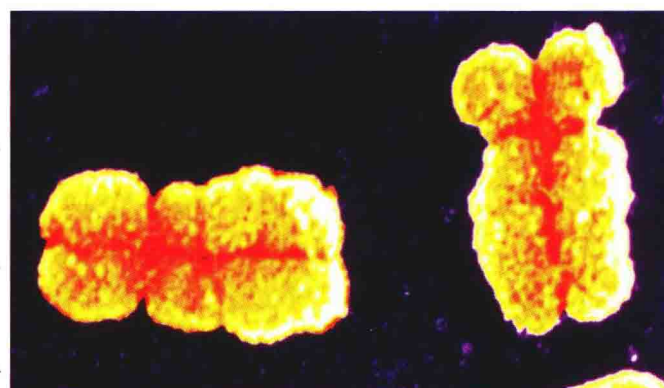
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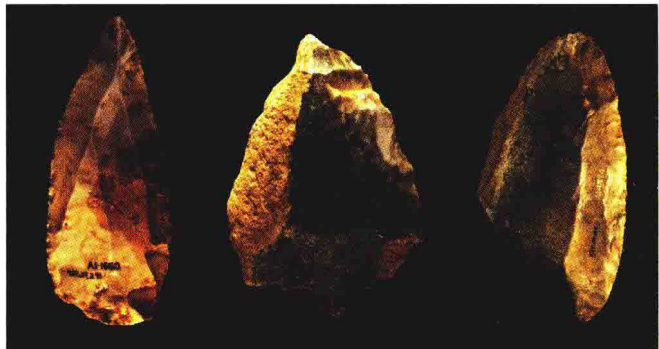
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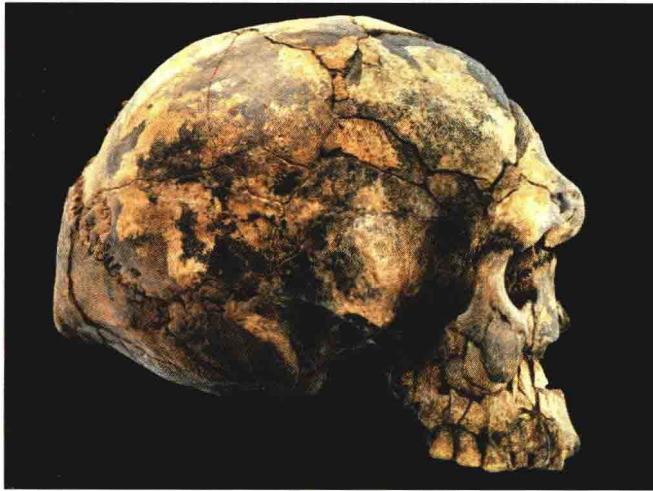
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