

Understanding Physical Anthropology and Archaeology

EIGHTH EDITION



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Preface

Since its debut in 1981, *Understanding Physical Anthropology and Archaeology* continues to evolve. Each new edition incorporates significant changes in content and organization in response to the rapid pace of discovery in the field and in recognition of the changing needs of the many students and professors who have used the book over the years. This new eighth edition represents the culmination of more than two decades of refinement.

As always, the book's major objective continues to be to provide introductory students with a current and comprehensive understanding of human biological and cultural development from an evolutionary perspective, as well as a thorough introduction to the scientific methods by which such information is derived. We have attempted to explain, in a step-by-step progression, how scientific inquiry is conducted, which methodologies are especially relevant to physical anthropology and archaeology, and what specific data researchers have found to support their current conclusions. This approach, we believe, aids students in more fully grasping and appreciating the information presented in these pages.

Additionally, and most basic to our entire approach, the writing style is carefully designed to be clear and understandable, while not insulting the intelligence of college-level readers. To assist students who may have had only minimal prior exposure to scientific topics, we provide a number of learning aids to promote comprehension. For example, a running glossary provides definitions in the margins when key terms are first presented and a full glossary appears at the back of the text. Numerous full-color images, diagrams, and maps have been carefully selected to enhance the narrative. Other helpful features are listed in the section below.

Major Features

Photo Essays There are four photo essays placed throughout the book. Each essay introduces topics to stimulate student interest in contemporary applied research done by physical anthropologists and archaeologists. The first photo essay, following Chapter 1, is entirely new for the eighth edition and presents a portrait of the varied careers pursued by individuals with degrees in physical anthropology and archaeology.

Issues are major boxed features, which are found at the end of selected odd number chapters. Issues focus on current controversial topics being discussed and debated

within the field of physical anthropology and archaeology. Examples include:

- Following Chapter 3, Genetic Screening: A Double-Edged Sword?
- Following Chapter 7, Primates in Biomedical Research: Ethics and Concerns
- Following Chapter 17, Who Invented Writing?

Digging Deeper are high-interest boxed features found throughout the book. They expand upon the topic under discussion in the chapter by providing a more in-depth look.

In-Chapter Learning Aids

- **Chapter outlines**, at the beginning of each chapter, list all major topics covered.
- 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 at the back of the book.
- **Figures**, including numerous photographs, line drawings, and maps, most in full color, are carefully selected and placed to directly support discussion in the text.
- **Questions for Review** at the end of each chapter reinforce key points and encourage students to think critically about what they have read.
- **Suggested Further Readings**, also found at the end of each chapter, are carefully selected to direct interested students toward accessible and authoritative resources for further reading.
- **Full bibliography** supports the citations provided throughout the text and gives students a demonstration of standard referencing style in scientific/scholarly presentation as well as guiding them to published source materials.
- **Resources on the Internet** is a new feature for the eighth edition. This learning aid is found at the end of each chapter. Resources include **Internet Exercises** incorporating specific sites on the Internet. These exercises are designed to help students become more competent in using the Internet. New to this edition also are the **InfoTrac® College Edition Exercises**, which utilize the free online library.
- Last, a major new addition to this edition is the systematic integration with the **Virtual Laboratories for Physical Anthropology CD-ROM, Second Edition**,

prepared by John Kappelman of the University of Texas at Austin. In the margins throughout the text there are icons linking the concepts discussed in the book with specific virtual labs on the CD-ROM.



The species concept is presented in Virtual Lab 1, section II.

Organization of the Eighth Edition

A primary strength of this text is that it introduces students both to the processes and to the consequences of human biological and cultural evolution. Following an introduction (Chapter 1) that briefly sets forth the field of anthropology and explains the authors' biocultural approach, the early part of the book (Chapters 2 and 3) provides the historical context for the development of evolutionary theory, both before and after Darwin, and examines the key role that genes play in biological inheritance and variation. Human population genetics and adaptive responses to environmental factors are explored in Chapters 4 and 5 to help understand differences found among modern humans.

The next section begins with a comprehensive overview of modern primate morphological and behavioral characteristics (Chapters 6 and 7), which helps the reader to understand how primates are distinguished from other mammals. Then follows a summary of primate evolution from the early Cenozoic era to the Pliocene epoch (Chapter 8), leading to a completely updated account of the relentless paleoanthropological search for the earliest hominid traces, primarily in southern and eastern Africa (Chapters 9 and 10). The record of *Homo erectus* and related forms in Africa, Asia, and Europe is considered in Chapter 11, while Chapter 12 deals with the evolutionary trends of the earliest *Homo sapiens* and of Neandertals. The eighth edition now covers the origin, dispersal, and cultural achievements of the earliest anatomically modern humans in a separate chapter, Chapter 13.

The final section of the text examines the subsequent biocultural course of our species. Because archaeology plays such a prominent role in revealing post-Pleistocene prehistory, a newly added Chapter 14 discusses the principal methods that archaeologists use to discover, excavate, date, and interpret cultural sites and artifacts. Chapter 15 presents current archaeological perspectives on the intriguing topic of Native American origins and early lifeways and also provides an overview of early Holocene hunters and gatherers in several other parts of the globe. Chapter 16 focuses on the key human invention of food production and the appearance of agricultural lifeways, which, in a few regions of the Old World and the Americas, promoted the rise of early pre-industrial civilizations, the topic of Chapters 17 and 18. We end with a short epilogue that considers humankind's contemporary situation from an evolutionary perspective.

What's New in the Eighth Edition?

Through its many editions, this text's authors have endeavored to achieve a balance between physical anthropology and archaeology that reflects our *biocultural* point of view. In part, this symmetry has been achieved through an emphasis on *paleoanthropology*, a multidisciplinary approach combining the methodologies of physical anthropology and archaeology in the discovery and study of early hominids. The eighth edition builds on this focus.

The addition of a new Chapter 14, "Understanding Prehistory: Archaeological Approaches," further enhances the representation of archaeology by introducing readers to the research objectives, standard field methods, and specialized analytical and dating techniques commonly employed by archaeologists (those working in Plio-Pleistocene contexts as well as in more recent situations, including the practice of *cultural resource management*). Some topics previously covered in the paleoanthropology chapter have been combined in this new chapter (e.g., dating methods, reconstructions of stone tool manufacturing techniques). In this way, we have sought to present a more coordinated introduction to archaeological techniques and methods. The paleoanthropology chapter itself—Chapter 9—has also been substantially reorganized to incorporate more material on behavioral and ecological interpretations of early hominids (as reflected in the new chapter title). Moreover, as in each successive edition previous to this one, additional pages have been allocated to the discussion of archaeological data bearing on our species' geographic dispersal and cultural elaboration, including the invention of food production and the emergence of complex societies in both the Old World and the New World. Several new box features on archaeological topics are found in Chapters 14 and 15.

Coverage of topics in physical anthropology has also been augmented in this edition. Chapter 5 expands the focus on infectious disease with an emphasis on HIV/AIDS. The discussion also deals with the role of cultural factors such as population growth, human-induced climate change, and overuse of antibiotics in the reemergence of some infectious diseases.

We have, of course, continued to incorporate the latest information on fossil hominids, including recent discoveries of Plio-Pleistocene species (*Ardipithecus*; *Australopithecus garhi*; *Kenyanthropus*) in Chapter 10; new discoveries of *Homo erectus* (or contemporaries) from Spain and Italy (Chapter 11); and recent finds of Neandertals or early modern *H. sapiens* from Portugal, France, and Croatia (Chapters 12 and 13). In addition, since many contemporary scholars recognize considerable complexity in the evolution of *Homo*, a new section in Chapter 11 presents varied interpretations and species designations (i.e., *H. rudolfensis*, *H. ergaster*, *H. heidelbergensis*, *H. neanderthalensis*). This eighth edition now devotes individual chapters to the archaic *Homo sapiens* such as Neandertals (Chapter 12) and the earliest anatomically modern humans and their Upper Paleolithic culture (Chapter 13). The exciting new attempts to extract and sequence Neandertal DNA are also covered in Chapter 12.

Chapter 15 has been extensively rewritten to incorporate exciting developments in the search for the earliest Americans, particularly in light of recently recalibrated radiocarbon chronologies. The latter part of the same chapter now examines Middle Stone Age foraging and food collecting from a more explicitly ecological perspective that anticipates our expanded consideration of food production and its consequences in Chapter 16. The distinguishing characteristics of civilizations receive more detailed treatment in Chapter 17, as does the rise of urbanism and the influential role of early cities in Old World societies. The treatment of New World civilizations in Chapter 18 has been thoroughly updated. An epilogue, new to this edition, considers our modern human situation from a biocultural and evolutionary perspective. The book's epilogue reinforces the contemporary relevance of the long human past that is the subject of this text, connecting it to the present and future of our species, with an evolutionary perspective on issues such as population growth, poverty, and environmental decline.

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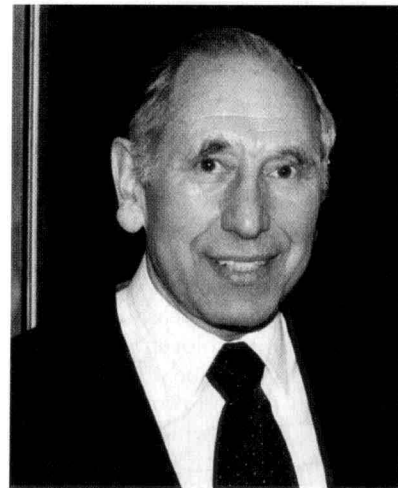
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This edition of *Understanding Physical Anthropology and Archaeology* is dedicated to our coauthor and friend, Harry Nelson.



1915–2000

Supplements

A full array of supplements for both instructors and students accompanies *Understanding Physical Anthropology and Archaeology*, Eighth Edition.

Supplements for Instructors

For the following supplements please contact your Wadsworth/Thomson Learning representative.

Instructor's Manual with Test Bank Written by the main text authors, each chapter includes a chapter outline and overview, learning objectives, lecture suggestions and enrichment topics. The Test Bank provides 40 to 70 questions per chapter.

A detailed media resource guide and a concise InfoTrac College Edition user guide are included as appendixes.

Wadsworth Physical Anthropology Transparency Acetates A selection of full-color acetates is available to help prepare lecture presentations. Free to qualified adopters.

Physical Anthropology Slides A selection of art found in the text is available as color slides.

ExamView® Computerized and Online Testing from Wadsworth/Thomson Learning Create, deliver, and customize tests and study guides (both print and online) in minutes with this easy-to-use assessment and tutorial system. ExamView offers both a Quick Test Wizard and an Online Test Wizard that guide you step-by-step through the process of creating tests, while its unique "WYSIWYG" capability allows you to see the test you are creating on the screen exactly as it will print or display online. You can build tests of up to 250 questions using up to 12 question types. Using ExamView's complete word processing capabilities, you can enter an unlimited number of new questions or edit existing questions.

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tures. AnthroLink 2002 gives instructors the ability to utilize images from the text to create their own lecture presentations or to use and manipulate the pre-made lecture presentation already on the CD-ROM.

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CNN® Today: Physical Anthropology Video Series Vol. 1, 2, and 3. The *CNN Today Physical Anthropology Videos Series* is an exclusive series jointly created by Wadsworth and CNN for the physical anthropology course. Instructors may choose between three 45-minute videotapes composed of short clips from recent CNN broadcasts. The videos illuminate the principles of physical anthropology and archaeology and their impact on today's world.

Web-Based Resources

Anthropology Online: Wadsworth Anthropology Resource Center <http://anthropology.wadsworth.com> Perhaps the most exciting new development in the complete supplementary package to accompany *Understanding Physical Anthropology and Archaeology*, Eighth Edition, is the newly developed and expanded website. The Wadsworth Anthropology Resource Center contains a wealth of information and useful tools for both instructors and students. After logging on, click on Turnbaugh, Eighth Edition, and proceed to the Student Resources section. There you will find extra Internet and InfoTrac College Edition exercises, flashcards, and online practice quizzes for each chapter. Anthropology Online contains this special feature:

A Virtual Tour of Applying Anthropology This special section of the website serves as an online resource center for the anthropology student. There is an essay, illustrated with video clips, on careers in anthropology written by Wadsworth author Gary Ferraro. The Applying Anthropology site includes information on careers in anthropology outside the academic setting, including advice on organizations which provide student internships, and hot links to graduate programs in applied anthropology.

Supplements for Students

Virtual Laboratories for Physical Anthropology CD-ROM, Second Edition, by John Kappelman The new version of this Interactive CD-ROM provides students with a hands-on computer component for doing lab assignments at school or at home. It encourages students to actively participate in their physical anthropology lab or course through the taking of measurements and the plotting of data, as well as giving them a format for testing their knowledge of important concepts. Contains full-color images, video clips, 3-D animations, sound, and more. In addition, students can link between this CD and the web page to access additional tutorial quizzes.

Researching Anthropology on the Internet Guide by David L. Carlson, Texas A&M University This useful guide is designed to assist anthropology students with doing research on the Internet. Part One contains general information necessary to get started and answers questions about security, the type of anthropology material available on the Internet, the information that is reliable and the sites that are not, the best ways to find research, and the best links to take students

where they want to go. Part Two looks at each main discipline in the area of anthropology, and refers students to sites where the most enlightening research can be obtained.

InfoTrac College Edition InfoTrac College Edition (available as a free option with newly purchased texts) gives you and your students four months of free access to an easy-to-use online database of reliable, full-length articles (not abstracts) from hundreds of top academic journals and popular sources. Among the journals which are available 24 hours a day, seven days a week, are *American Anthropologist*, *Current Anthropology*, *Discover*, and *Science*. Contact your Wadsworth/Thomas learning representative for more information.

Lab Manual and Workbook for Physical Anthropology, Fourth Edition, by Diane L. France, Colorado State University This lab manual emphasizes human osteology, forensic anthropology, anthropometry, primates, human evolution, and genetics. It provides students with hands-on lab assignments to help make the concepts of physical anthropology clear. It contains short-answer questions, identification problems, and observation exercises.

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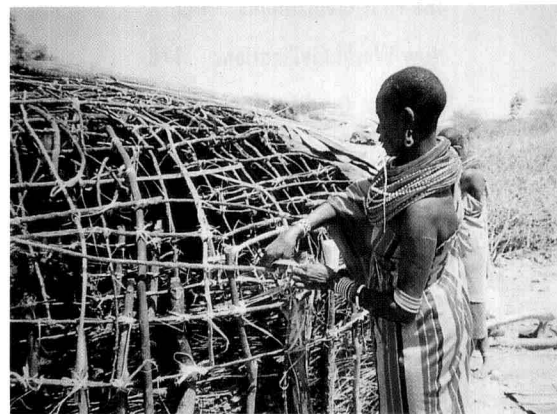
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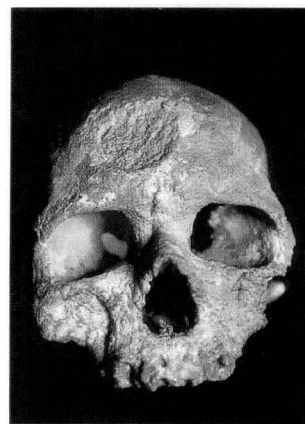
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Introduction

CHAPTER

1

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What Is Anthropology?

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The Scientific Method

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See the following sections of the CD-ROM for topics covered in this chapter: Virtual Lab 1, section I and Virtual Lab 2.

Anthropology

The field of inquiry that studies human culture and evolutionary aspects of human biology; includes cultural anthropology, archaeology, linguistics, and physical anthropology.

Culture

All aspects of human adaptation, including technology, traditions, language, and social roles. Culture is learned and transmitted from one generation to the next by nonbiological (i.e., not genetic) means.

Biocultural evolution

The mutual, interactive evolution of human biology and culture; the concept that biology makes culture possible and that culture further influences the direction of biological evolution; a basic concept in understanding the unique components of human evolution.

Introduction

With notebook in hand, a young man peers intently through the tangled bushes to catch a glimpse of a chimpanzee mother playing with her infant. Seated before a computer in her university laboratory, a white-coated scientist closely compares the DNA sequences of a pair of fraternal twins. In a far-off tropical village, a researcher interviews a tribal elder, carefully recording the old woman's comments as she continues to plait a basket of plant fiber. On a dusty mesa top in New Mexico, an excavator brushes away the sand to expose fragments of a boldly decorated pottery vessel. Manila folders and cardboard boxes clutter a long library table, at which an earnest-looking student peruses a letter describing an early encounter with an indigenous group of people living along the Sepik River in New Guinea. At a Smithsonian museum, a small group of curators and graduate students uses a caliper-like instrument to measure a bone, entering the results into a laptop computer.

Each of these people is an anthropologist, and all are engaged in anthropological research. **Anthropology** is the study of human beings, and as a scientific discipline anthropology is concerned with all aspects of what it is to be human. Such a broad focus encompasses all topics related to behavior including: social relationships (e.g., kinship and marriage patterns), religion, ritual, technology, subsistence techniques, and economic and political systems. Anthropology is also concerned with the numerous biological dimensions of our species such as: genetics, anatomy, skeletal structure, blood types and other biochemical factors, adaptation to disease and other environmental factors, body build, pigmentation, nutrition, and ultimately, all the evolutionary processes that have resulted in the development of modern humans. Anthropology, therefore, is a holistic science, with the entire scope of humankind, past and present, as its focus.

In contrast, an economist, for example, might study market systems—the production, distribution, and consumption of goods—and only rarely, if ever, consider the effects of religion or kinship on economic systems. But anthropology's holistic approach recognizes that many factors contribute to whatever we humans do, even including economic transactions. Anthropologists incorporate findings from many academic fields as they seek to understand and explain what being human is all about. In a practical sense, however, no single anthropologist can hope to encompass the entire discipline.

The Biocultural Approach

While no one specialist can adequately cover the entire breadth of anthropology, there is a unifying theme that helps give all anthropologists a shared perspective: As humans have evolved over the last several million years, the interdependent influences of biology and **culture** have shaped our evolutionary history. Indeed, over time, biology and culture have interacted in such a way that humans are said to be the product of **biocultural evolution**. It is by tracing the interaction between biology and culture and attempting to understand *how* the process has occurred that we are able to come to grips scientifically with what we are and how we came to be.

As this book will emphasize, human organisms are but one recent and fairly short chapter in the book of life composed by evolution. However, a component that has come to dominate human biological evolution to an extent unknown among other organisms is culture. Culture is an extremely important concept, not only as it pertains to modern human beings, but also in terms of its critical role in human evolution. It has been said that there are as many definitions of culture as there are people who attempt to define it. Quite simply, culture can be considered the strategy by which humans adapt to the natural environment. In this sense, culture includes technologies that range from stone tools to computers; subsistence patterns ranging from hunting and gathering to agribusiness on a global scale; housing types, from thatched huts to skyscrapers; and clothing, from animal skins to high-tech synthetic fibers (Fig. 1–1). Because religion, values, social organization,