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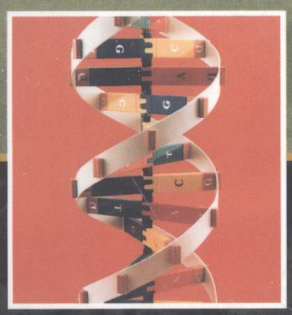
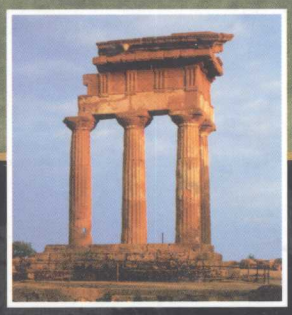
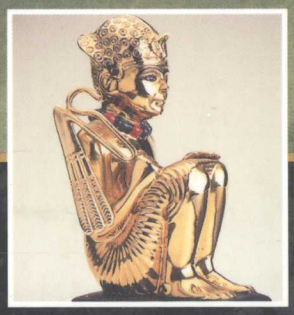
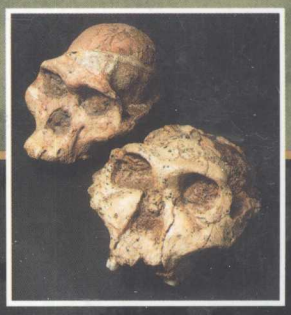

PHYSICAL ANTHROPOLOGY AND ARCHAEOLOGY

Carol R. Ember
Melvin Ember
Peter N. Peregrine

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Prentice Hall

Upper Saddle River, New Jersey 07458

Library of Congress Cataloging-in-Publication Data

EMBER, CAROL R.
Physical anthropology and archaeology/Carol R. Ember, Melvin Ember, Peter N. Peregrine.—1st ed.
p. cm.
Includes bibliographical references and index.
ISBN 0-13-092944-1 (pbk.)
1. Physical anthropology. 2. Archaeology. I. Ember, Melvin. II. Peregrine, Peter N. (Peter Neal). III. Title.

GN60 .E45 1995
599.9—dc21

2001033929

VP, Editorial Director: Laura Pearson
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Cover Art (left to right): FBI Federal Bureau of Investigation; Joe Cornish/Stone; Silver Burdett Ginn; John Reader/Science Photo Library/Photo Researchers, Inc.

This book was set in 10/11.5 Minion by ElectraGraphics
and was printed and bound by Courier Companies, Inc.
The cover was printed by Phoenix Color Corp.

Prentice Hall

Printed in the United States of America
10 9 8 7 6 5 4 3 2 1

ISBN 0-13-092944-1

Pearson Education LTD., London
Pearson Education Australia PTY, Limited, Sydney
Pearson Education Singapore, Pte. Ltd
Pearson Education North Asia Ltd, Hong Kong
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Boxes

Current Issues

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APPLIED ANTHROPOLOGY

PREFACE

The challenge of writing a textbook for an introductory course in physical anthropology and archaeology is finding the right balance between the details of human evolution and prehistory and conveying the larger picture so that students can understand where humans came from, where we might be going, and how knowledge about the past may be useful. This first edition of *Physical Anthropology and Archaeology* is a much expanded and revised version of the physical and archaeology sections of Ember and Ember's *Anthropology*. As always, we try to go beyond descriptions. We are interested not only in *what* humans are and were like; we are also interested in *why* they got to be that way, in all their variety. When there are alternative explanations, we try to communicate the necessity to evaluate them both logically and on the basis of the available evidence. Throughout the book, we try to communicate that no idea, including ideas put forward in textbooks, should be accepted even tentatively without supporting tests that could have gone the other way.

This book has four foci. First, we focus on the physical evidence of human evolution—not only the fossils but also the genetics and evolutionary processes that help us make sense of the fossils. Second, we focus on the major "revolutions" in human cultural evolution—the emergence of patterned stone tools, the elaboration of complex culture, the development of domesticated plants and animals, and the rise of cities and states. Third, we explore contemporary variation in humans, and particularly the concept of "race." Finally, we consider how physical anthropologists and archaeologists apply their knowledge to problems and issues of practical importance today.

Part I: Introduction

Chapter 1: What Is Anthropology?

Chapter 1 introduces the student to anthropology. We discuss what we think is special and distinctive about anthropology in general, and about each of its subfields in particular. We outline how each of the subfields is related to other disciplines such as biology, psychology, and sociology. We direct attention to the increasing importance of applied anthropology. There are four boxes, each focusing on an individual anthropologist and her or his work.

Chapter 2: How We Discover the Past

Chapter 2 gives an overview of archaeological research. We discuss the types of evidence archaeologists and paleoanthropologists use to reconstruct the past, the methods they use to collect the evidence, and how they go about analyzing and interpreting the evidence of the past. We also describe the many techniques used by archaeologists and paleoanthropologists to determine the age of archaeological materials and fossils. There are two boxes, one examining evidence for unilinear trends in cultural evolution, the other considering how gender is studied by archaeologists.

Part II: Human Evolution: Biological and Cultural

Chapter 3: Genetics and Evolution

Chapter 3 discusses evolutionary theory as it applies to all forms of life, including humans. Following an extensive review of genetics and the processes of evolution, including natural selection and what it means, we discuss how natural selection may operate on behavioral traits and how cultural evolution differs from biological evolution. We consider ethical issues posed by the possibility of genetic engineering. The first box examines the evidence suggesting that evolution proceeds abruptly rather than slowly and steadily. The second box discusses whether genetic engineering should be feared.

Chapter 4: The Living Primates

Chapter 4 describes the living nonhuman primates and their variable adaptations as background for understanding the evolution of primates in general and humans in particular. After describing the various kinds of primate, we discuss some possible explanations of how the primates differ—in body and brain size, size of social group, and female sexuality. The chapter ends with a discussion of the distinctive features of humans in comparison with the other primates. The first box deals with how and why many primates are endangered and how they might be protected. The second box describes a primatologist and some of her work.

Chapter 5: Primate Evolution: From Early Primates to Hominoids

Chapter 5 begins with the emergence of the early primates and ends with what we know or suspect about the Miocene apes, one of whom (known or unknown) was ancestral to bipedal hominids. We link major trends in primate evolution to broader environmental changes that may have caused natural selection to favor new traits. To highlight how theory is generated and revised, the first box explains how a paleoanthropologist has reexamined his own theory of primate origins. The second box describes a giant ape that lived at the same time as the first humans, and why that ape became extinct.

Chapter 6: The First Hominids

Chapter 6 discusses the evolution of bipedal locomotion—the most distinctive feature of the group that includes our genus and those of our direct ancestors, the australopithecines. We discuss the various types of aus-

tralopithecines and how they might have evolved. The first two boxes discuss new australopithecine finds and how they appear to fit into our current understanding of human evolution. The third box describes the technique of cladistic analysis, widely used by paleoanthropologists to chart evolutionary relationships.

CHAPTER 7: THE ORIGINS OF CULTURE AND THE EMERGENCE OF HOMO

Chapter 7 examines the first clear evidences of cultural behavior—stone tools—and other clues suggesting that early hominids had begun to develop culture about 2.5 million years ago. We discuss what culture is and how it may have evolved. We then discuss the hominids—the first members of our genus, *Homo*—who are most likely responsible for the early signs of cultural behavior. The first box discusses hunting behavior by chimpanzees as a model for early human hunting. The second box examines the evolution of the brain and the physical changes in early humans that allowed the brain to increase in size. The third box explains how archaeologists and paleoanthropologists distinguish stone tools from ordinary rocks.

CHAPTER 8: HOMO ERECTUS AND THE ORIGINS OF LANGUAGE

This chapter focuses on *Homo erectus,* the first hominid to leave Africa and the first to demonstrate complex cultural behavior. We examine *Homo erectus* culture through stone tools, hunting and butchering of large game, and campsites. We then consider whether *Homo erectus* may have developed language. After describing language and its evolution, we conclude that *Homo erectus* did not likely have language as we know it today. The first box discusses research evaluating the claim that *Homo erectus* should be divided into two species. The second box describes how paleoanthropologists and artists work together to reconstruct the faces of early humans. The third box considers whether mother-infant communication may have led to the development of language.

Part III: Modern Humans

CHAPTER 9: THE EMERGENCE OF HOMO SAPIENS

Chapter 9 examines the transition between *Homo erectus* and *Homo sapiens* and the emergence of modern-looking humans. In keeping with our global orientation, we discuss fossil and archaeological evidence from many areas of the world, not just from Europe and the Near East. We give special consideration to the Neandertals and the question of their relationship to modern humans. One box feature examines patterns of growth and development among Neandertals as a way of evaluating how long their period of infancy was. The other box describes the evidence from mitochondrial DNA regarding the "Out-of-Africa" theory of modern human origins.

CHAPTER 10: THE UPPER PALEOLITHIC WORLD

Chapter 10 considers the cultures of modern humans in the period before agriculture developed, roughly 40,000 to 10,000 years ago. We examine their tools, their economies, and their art—the first art made by humans. We also discuss human colonization of North and South America and the impact of humans on the new environments they encountered. The first box examines the possible routes humans may have taken to enter the Americas. The second box considers how women are depicted in Upper Paleolithic art.

CHAPTER 11: ORIGINS OF FOOD PRODUCTION AND SETTLED LIFE

Chapter 11 deals with the emergence of broad-spectrum collecting and settled life, and then the domestication of plants and animals in various parts of the world. Our discussion focuses mainly on the possible causes and consequences of these developments in Mesoamerica and the Near East, but we also consider Southeast Asia, Africa, North and South America, and Europe. The first box examines the domestication of dogs and cats; the second box describes how researchers are finding out about ancient diets from chemical analysis of bones and teeth.

CHAPTER 12: ORIGINS OF CITIES AND STATES

Chapter 12 deals with the rise of civilizations in various parts of the world and the theories that have been offered to explain the development of state-type political systems. Our focus is on the evolution of cities and states in Mesoamerica and the Near East, but we also discuss the rise of cities and states in South America, South Asia, China, and Africa. How states affect people living in them and their environments is examined. We conclude with a discussion of the decline and collapse of states. One box considers the links between imperialism, colonialism, and the state. The other box discusses the consequences of ancient imperialism for women's status.

CHAPTER 13: HUMAN VARIATION AND ADAPTATION

Chapter 13 brings the discussion of human biological and cultural evolution into the present by dealing with physical variation in living human populations and how physical anthropologists study and explain such variation. We examine how both the physical environment and the cultural environment play important roles in human physical variation. In a section on race and racism we discuss why many anthropologists think the concept of "race" as applied to humans is not scientifically useful. We talk about the myths of racism and how "race" is largely a social category in humans. The first box deals with biological factors affecting the capacity to have offspring; the second box reviews differences in average I.Q. scores and what

relevant studies are provided in complete notes by chapter at the end of the book.

BIBLIOGRAPHY AT THE END OF THE BOOK

All of the references cited throughout the book are collected and listed at the end of the book.

Supplements

The supplement package for this textbook has been carefully crafted to amplify and illuminate materials in the text itself.

FOR THE PROFESSOR

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Anthropology on the Internet: Evaluating Online Resources, 2001 This guide focuses on developing the critical thinking skills necessary to evaluate and use online sources effectively. The guide also provides a brief introduction to navigating the Internet, along with complete references related specifically to the anthropology discipline and how to use the *Companion Websites™* available for many Prentice Hall textbooks. This brief supplementary book is free to students when shrinkwrapped as a package with *any anthropology title.*

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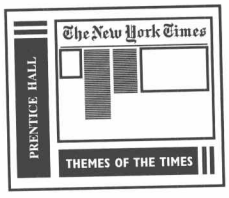

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Acknowledgments

We thank the people at Prentice Hall for all their help: Nancy Roberts, Publisher for the Social Sciences; Sharon

Chambliss, Managing Editor; Joan Stone for seeing the manuscript through the production process; and Sheila Norman for photo research.

We could not include all the suggestions they made, but we are grateful to the following people for their suggestions about what to include in the new chapter on medical anthropology: Carole Browner, William Dressler, Alan Goodman, W. Penn Handwerker, Leslie Sue Lieberman, Shirley Lindenbaum, Margaret Lock, and Arthur Rubel.

We want to thank the following for reviewing our other chapters and making suggestions about them:

Marie Boutté, University of Nevada, Reno
I. Randolph Daniel, Jr., East Carolina University
Meini Deng, Edmonds Community College
Jeffrey R. Hanson, University of Texas–Arlington
S. Homes Hogue, Mississippi State University
Lucy Jayne Kamau, Northeastern Illinois University
Timothy J. Kloberdanz, North Dakota State University
Michael C. Robbins, University of Missouri

Thank you all, named and unnamed, who gave us advice.

Carol R. Ember, Melvin Ember, and Peter N. Peregrine

About the Authors

Carol R. Ember started at Antioch College as a chemistry major. She began taking social science courses because some were required, but she soon found herself intrigued. There were lots of questions without answers, and she became excited about the possibility of a research career in social science. She spent a year in graduate school at Cornell studying sociology before continuing on to Harvard, where she studied anthropology primarily with John and Beatrice Whiting.

For her Ph.D. dissertation she worked among the Luo of Kenya. While there she noticed that many boys were assigned "girls' work," such as babysitting and household chores, because their mothers (who did most of the agriculture) did not have enough girls to help out. She decided to study the possible effects of task assignment on the social behavior of boys. Using systematic behavior observations, she compared girls, boys who did a great deal of girls' work, and boys who did little such work. She found that boys assigned girls' work were intermediate in many social behaviors, compared with the other boys and girls. Later, she did cross-cultural research on variation in marriage, family, descent groups, and war and peace, mainly in collaboration with Melvin Ember, whom she married in 1970. All of these cross-cultural studies tested theories on data for worldwide samples of societies.

From 1970 to 1996, she taught at Hunter College of the City University of New York. She has also served as president of the Society of Cross-Cultural Research and was one of the directors of the Summer Institutes in Comparative Anthropological Research, which were funded by the National Science Foundation. She is now executive director at the Human Relations Area Files, Inc., a nonprofit research agency at Yale University.

After graduating from Columbia College, Melvin Ember went to Yale University for his Ph.D. His mentor at Yale was George Peter Murdock, an anthropologist who was instrumental in promoting cross-cultural research and building a full-text database on the cultures of the world to facilitate cross-cultural hypothesis testing. This database came to be known as the Human Relations Area Files (HRAF) because it was originally sponsored by the Institute of Human Relations at Yale. Growing in annual installments and now distributed in electronic format, the HRAF database currently covers more than 370 cultures, past and present, all over the world.

Melvin Ember did fieldwork for his dissertation in American Samoa, where he conducted a comparison of three villages to study the effects of commercialization on political life. In addition, he did research on descent groups and how they changed with the increase of buying and selling. His cross-cultural studies focused originally on variation in marital residence and descent groups. He has also done cross-cultural research on the relationship between economic and political development, the origin and extension of the incest taboo, the causes of polygyny, and how archaeological correlates of social customs can help us draw inferences about the past.

After four years of research at the National Institute of Mental Health, he taught at Antioch College and then Hunter College of the City University of New York. He has served as president of the Society for Cross-Cultural Research and has been president since 1987 of the Human Relations Area Files, Inc., a nonprofit research agency of Yale University.

Peter N. Peregrine came to anthropology after completing an undergraduate degree in English. He found anthropology's social scientific approach to understanding humans more appealing than the humanistic approach he had learned as an English major. He undertook an ethnohistorical study of the relationship between Jesuit missionaries and Native American peoples for his master's degree and realized that he needed to study archaeology to understand the cultural interactions experienced by Native Americans prior to contact with the Jesuits.

While working on his Ph.D. at Purdue University, Peter Peregrine did research on the prehistoric Mississippian cultures of the eastern United States. He found that interactions between groups were common and had been shaping Native American cultures for centuries. Native Americans approached contact with the Jesuits simply as another in a long string of intercultural exchanges. He also found that relatively little research had been done on

Native American interactions and decided that comparative research was a good place to begin examining the topic. In 1990 he participated in the Summer Institute in Comparative Anthropological Research, where he met Carol R. Ember and Melvin Ember.

Peter Peregrine taught at Juniata College and is currently Associate Professor and Chair of the anthropology department at Lawrence University in Appleton, Wisconsin. He serves as research associate for the HRAF Collection of Archaeology and is co-editor with Melvin Ember of the *Encyclopedia of Prehistory*. He continues to do archaeological research, and he recently celebrated his first decade of teaching anthropology and archaeology to undergraduate students.

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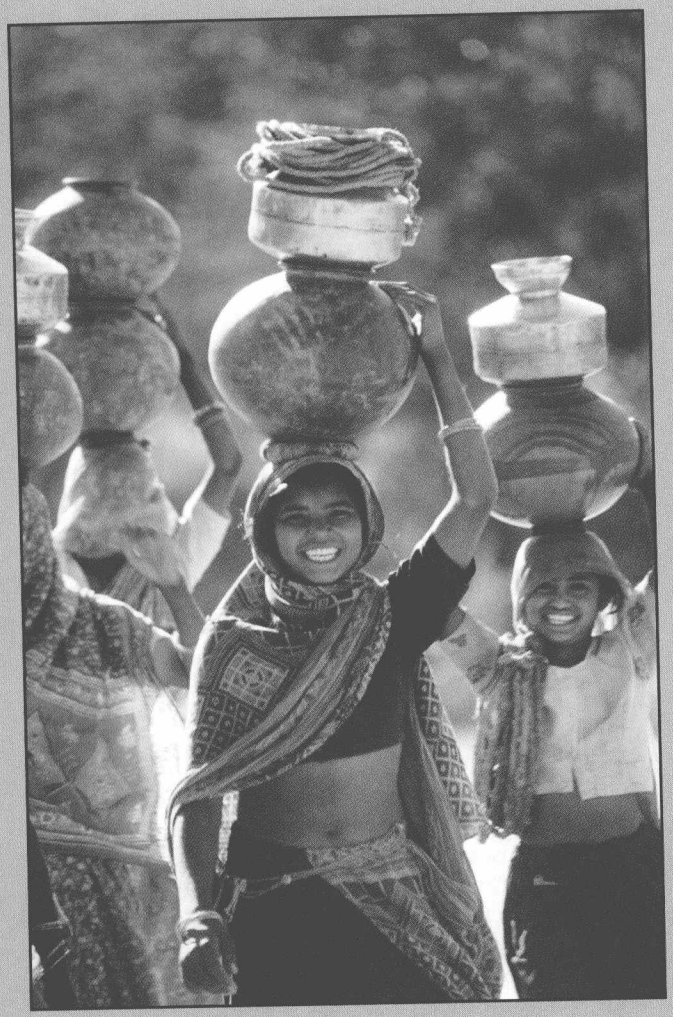

Chapter Outline

The Scope of Anthropology

The Holistic Approach

The Anthropological Curiosity

Fields of Anthropology

Applied Anthropology

The Relevance of Anthropology

Anthropology, by definition, is a discipline of infinite curiosity about human beings. The term comes from the Greek *anthropos* for "man, human" and *logos* for "study." Anthropologists seek answers to an enormous variety of questions about humans. They are interested in discovering when, where, and why humans appeared on the earth, how and why they have changed since then, and how and why modern human populations vary in certain physical features. Anthropologists are also interested in how and why societies in the past and present have varied in their customary ideas and practices. There is a practical side to anthropology too. Applied and practicing anthropologists put anthropological methods, information, and results to use, in efforts to solve practical problems.

But defining anthropology as the study of human beings is not complete, for such a definition would appear to incorporate a whole catalog of disciplines: sociology, psychology, political science, economics, history, human biology, and perhaps even the humanistic disciplines of philosophy and literature. Needless to say, practitioners of the many other disciplines concerned with humans would not be happy to be regarded as being in subbranches of anthropology. After all, most of those disciplines have existed longer than anthropology, and each is somewhat distinctive. There must, then, be something unique about anthropology—a reason for its having developed as a separate discipline and for its having retained a separate identity over the last 100 years.

The Scope of Anthropology

Anthropologists are generally thought of as individuals who travel to little-known corners of the world to study exotic peoples or who dig deep into the earth to uncover the fossil remains or the tools and pots of people who lived long ago. These views, though clearly stereotyped, do indicate how anthropology differs from other disciplines concerned with humans. Anthropology is broader in scope, both geographically and historically. Anthropology is concerned explicitly and directly with all varieties of people throughout the world, not just those close at hand or within a limited area. It is also interested in people of all periods. Beginning with the immediate ancestors of humans, who lived a few million years ago, anthropology traces the development of humans until the present. Every part of the world that has ever contained a human population is of interest to anthropologists.

Anthropologists have not always been as global and comprehensive in their concerns as they are today. Traditionally, they concentrated on non-Western cultures and left the study of Western civilization and similarly complex societies, with their recorded histories, to other disciplines. In recent years, however, this division of labor among the disciplines has begun to disappear. Now anthropologists work in their own and other complex societies.

What induces anthropologists to choose so broad a subject for study? In part, they are motivated by the belief that any suggested generalization about human beings, any possible explanation of some characteristic of human culture or biology, should be shown to apply to many times and places of human existence. If a generalization or explanation does not prove to apply widely, we are entitled or even obliged to be skeptical about it. The skeptical attitude, in the absence of persuasive evidence, is our best protection against accepting invalid ideas about humans.

For example, when American educators discovered in the 1960s that African American schoolchildren rarely drank milk, they assumed that lack of money or education was the cause. But evidence from anthropology suggested a different explanation. Anthropologists had known for years that in many parts of the world where milking animals are kept, people do not drink fresh milk; rather, they sour it before they drink it, or they make it into cheese. Why they do so is now clear. Many people lack an enzyme, lactase, that is necessary for breaking down lactose, the sugar in milk. When such people drink regular milk, it actually interferes with digestion. Not only is the lactose in milk not digested but other nutrients are less likely to be digested as well; in many cases, drinking milk will cause cramps, stomach gas, diarrhea, and nausea. Studies indicate that milk intolerance is found in many parts of the world.[1] The condition is common in adulthood among Asians, southern Europeans, Arabs and Jews, West Africans, Inuit (Eskimos), and North and South American Indians, as well as African Americans. Because anthropologists are acquainted with human life in an enormous variety of geographic and historical settings, they are often able to correct mistaken beliefs about different groups of people.

The Holistic Approach

In addition to the worldwide as well as historical scope of anthropology, another distinguishing feature of the discipline is its **holistic,** or multifaceted, approach to the study of human beings. Anthropologists study not only all varieties of people but many aspects of human experience as well. For example, when describing a group of people, an anthropologist might discuss the history of the area in which the people live, the physical environment, the organization of family life, the general features of their language, the group's settlement patterns, political and economic systems, religion, and styles of art and dress.

In the past, individual anthropologists tried to be holistic and cover many subjects. Today, as in many other disciplines, so much information has been accumulated that anthropologists tend to specialize in one topic or area. Thus, one anthropologist may investigate the physical characteristics of some of our prehistoric ancestors. Another may study the biological effect of the environment on a human population over time. Still another will concentrate on the customs of a particular group of people.

Despite this specialization, however, the discipline of anthropology retains its holistic orientation in that its many different specialties, taken together, describe many aspects of human existence, both past and present.

The Anthropological Curiosity

Thus far we have described anthropology as being broader in scope, both historically and geographically, and more holistic in approach than other disciplines concerned with human beings. But this statement again implies that anthropology is the all-inclusive human science. How, then, is anthropology really different from those other disciplines? We suggest that anthropology's distinctiveness lies principally in the kind of curiosity it arouses.

Anthropologists are concerned with many types of questions: Where, when, and why did people first begin living in cities? Why do some peoples have darker skin than others? Why do some languages contain more terms for color than other languages? Why do women have more of a voice in politics in some societies than in others? Why do populations differ in their acceptance of birth control? Although these questions deal with very different aspects of human existence, they have at least one thing in common: They all deal with *typical characteristics* (traits, customs) of particular populations. The typical characteristic of a people might be relatively dark skin, a language with many color terms, female participation in politics, or acceptance of birth control. This concern with typical characteristics of populations is perhaps the most distinguishing feature of anthropology. For example, whereas economists take a monetary system for granted and study how it operates, anthropologists ask why only some societies during the last few thousand years used money. In short, anthropologists are curious about the typical characteristics of human populations—how and why such populations and their characteristics have varied throughout the ages.

Fields of Anthropology

Different anthropologists concentrate on different typical characteristics of societies. Some are concerned primarily with *physical,* or *biological, characteristics* of human populations; others are interested principally in what we call *cultural characteristics.* Hence there are two broad classifications of subject matter in anthropology: **physical anthropology** (sometimes called biological anthropology) and **cultural anthropology.** Physical anthropology is one major field of anthropology. Cultural anthropology is divided into three major subfields—archaeology, linguistics, and ethnology. Ethnology, the study of recent cultures, is now usually referred to by the parent name, cultural anthropology (see Figure 1–1). Cross-cutting these four fields is a fifth, **applied** or **practicing anthropology.**

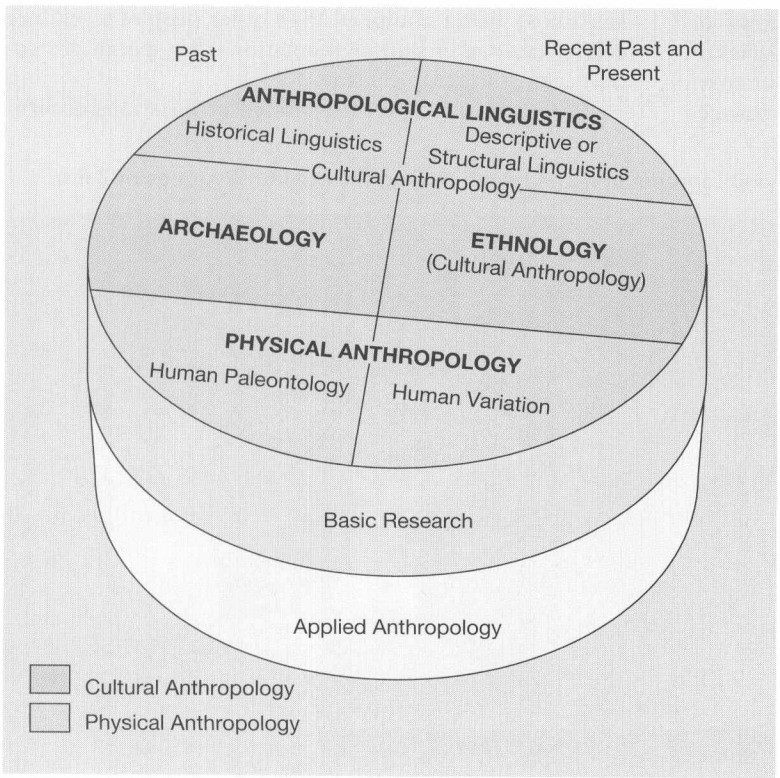

Figure 1–1
The Subdivisions of Anthropology

The four major subdisciplines of anthropology (in bold letters) may be classified according to subject matter (physical or cultural) and according to the period with which each is concerned (distant past versus recent past and present). There are applications of anthropology in all four subdisciplines.