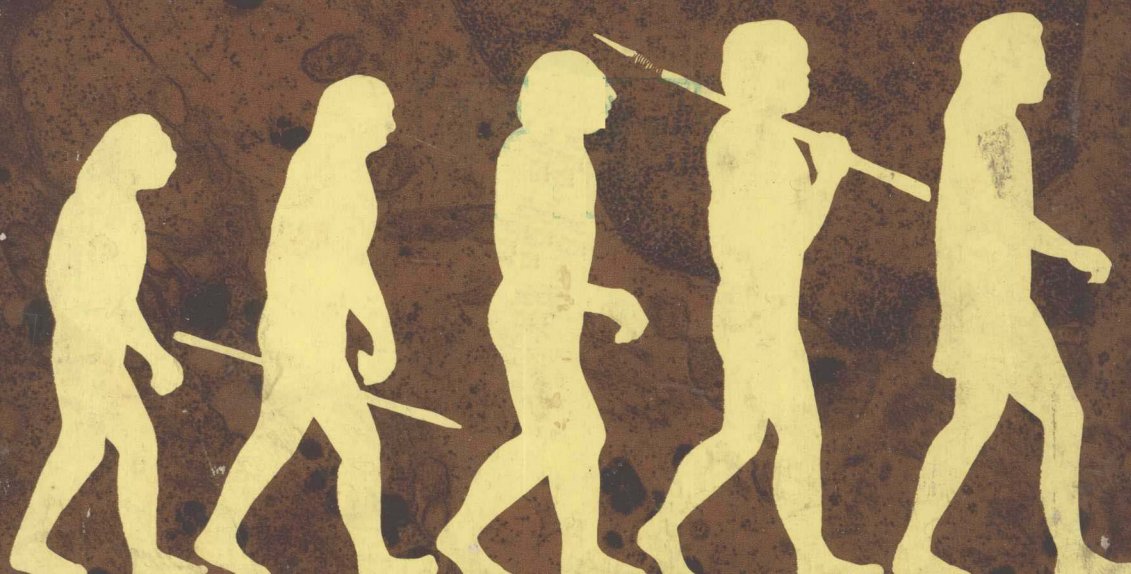


MARK L. WEISS • ALAN E. MANN

HUMAN BIOLOGY AND BEHAVIOR

AN ANTHROPOLOGICAL
PERSPECTIVE

FOURTH EDITION



Human Biology and Behavior

AN ANTHROPOLOGICAL PERSPECTIVE

Fourth Edition

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(continued on page 594)

*To Our Parents,
with Love*

Preface to the Fourth Edition

Human Biology and Behavior is intended to introduce students to physical anthropology. The book begins with a brief history of anthropology and its integration within the social and political history of the last two hundred years, followed by a discussion of general evolutionary thought. With evolution as a framework, we then deal with long-term biological and behavioral trends in primate and human evolution, ending with the hows and whys of modern human variation.

We believe that an introductory text should emphasize two major themes, adaptation and evolution, and their interrelationships with successful behavior. We have tried to present the basic data of modern physical anthropology within a framework of these themes, concentrating on being intelligible and on using a minimum of jargon, but not oversimplifying. We have not given neat conclusions to problems to make it easy for the reader. If a question, such as the origin of anatomically modern humans, is currently unresolved, we list the alternative hypotheses, summarize the data, and then allow the readers to draw their own conclusions. We have also made every effort to integrate material from branches of anthropology, such as archaeology and ethnology.

Since many introductory students may not encounter another anthropology course beyond this one, we have tried to convey how anthropological thinking can be applied to help answer significant questions: Not just how but why do people differ at every level, from molecules to behaviors? How much of our behavior, if any, is built into us? What is a proper diet? Why do some people have certain diseases? What does playing accomplish? The uniqueness of anthropology lies not so much in its data — which often come from other disciplines — as in its way of analyzing and interrelating the data. We hope that the comparative, evolutionary view of human existence comes through in the book and that readers will use the perspective in analyzing current and future issues.

The fourth edition is marked by significant updating as well as attempts at increased clarity where necessary. The discussion of genetics (Chapter 2) has been expanded to lay the groundwork for the application of biotechnology to the study of primate evolution (Chapter 5). The genetics chapter now preceeds any significant discussion of evolutionary mechanisms (Chapter 3). The introduction to evolution has expanded coverage of classic Neo-Darwinian thought and of recent challenges to traditional ideas about the rates and modes of evolution. The

vertebrate evolution section (Chapter 4) provides a discussion of the suggested events that marked the Mesozoic/Cenozoic boundary, as well as additional comparative illustrations. The coverage of the primates is now organized into three chapters (5, 6, and 7), with an introductory overview of taxonomy and distribution followed by chapters on evolution and behavior. The primate evolution chapter (6), like those devoted to hominid evolution (Chapters 8, 9, and 10), reflects the reevaluation of primate and human evolution necessitated by recent fossil discoveries, with the fall from grace of “*Ramapithecus*” perhaps being the most noteworthy. The section on modern human variation has been updated to include information derived from molecular biology, as for sickle-cell hemoglobin and restriction enzyme polymorphisms, and expanded for greater coverage of growth and development. Throughout this edition we have tried to improve clarity of passages deemed difficult by students. The glossary too has been significantly modified, and the first text mention of a listed word is presented in italics. A complimentary Instructor’s Manual is available to instructors requesting it from the publisher on school letterhead.

Students are often justifiably awed by the appearance physical anthropology gives of covering virtually everything about people and evolution. As might be imagined, no one person can cover all the relevant areas with a high degree of expertise; hence our coauthorship. Although each of us concentrated on his own area of specialization, we cooperated throughout the book’s development. Being trained at the same institution helped provide the necessary commonality of background.

In addition to the students and colleagues who provided much sound advice during the preparation of all four editions, we (MLW) would particularly like to thank Alain Blanchetot, Paul Barrie, Stephen Harris and Alec Jeffreys for their aid in pursuing the applications of molecular biology to physical anthropology. We extend our gratitude to the reviewers of the fourth edition: Claud A. Bramblett, University of Texas at Austin; Marcia Carman, San Diego City College; Marc R. Feldesman, Portland State University; Roger M. Lajeunesse, California State University, Fresno; Joseph A. Mannino, University of Wisconsin-Green Bay; Louanna Pet-tay, California State University, Sacramento; David Glenn Smith, University of California, Davis; Robert W. Sussman, Washington University. One of us (AEM) would especially like to thank Janet Monge for her help in all the phases of preparation of this edition. In guiding this edition to final published form, Lauren Green was a thoroughly professional editor, for which we express our genuine thanks. Thanks also to Brad Gray, Anthropology Editor, his assistant Anne Bingham, and Kim Rieck Fisher and Janice Friedman, all of Little, Brown College Division. We also express our appreciation to Linda Darga and Karen Davis for preparing the Instructor’s Manual. We especially thank Professor S. L. Washburn for his encouragement and help during our apprenticeship at Berkeley and for his contributions to anthropology.

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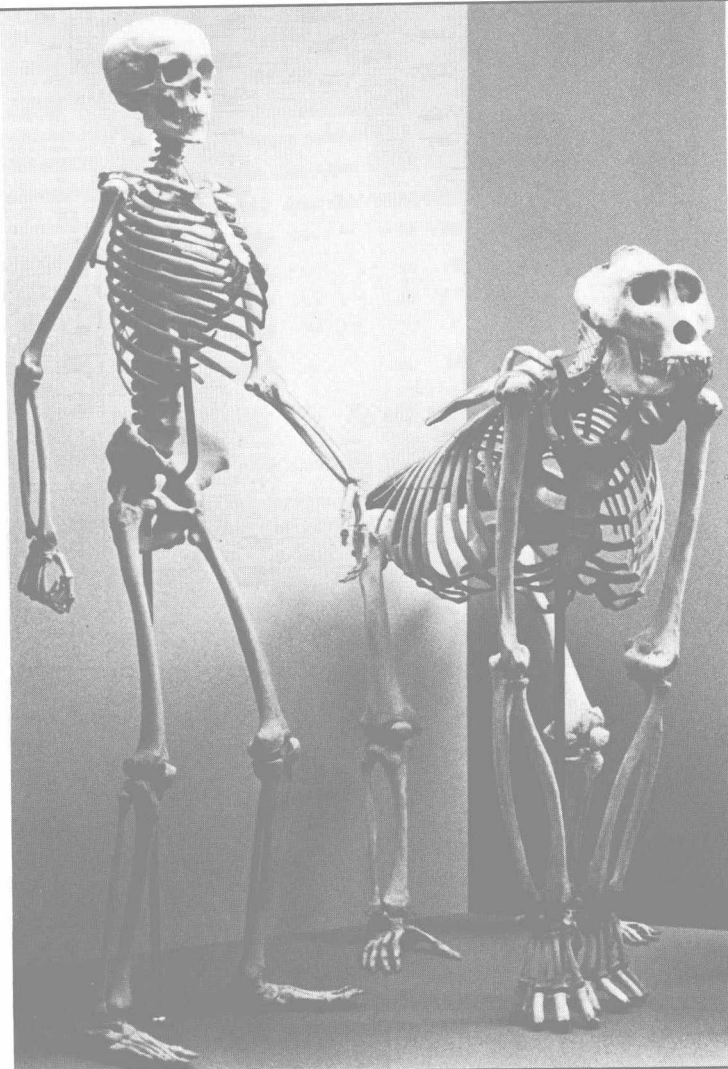
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Human Biology and Behavior

Chapter 1



The Perspective of Physical Anthropology

The world is not as simple a place as people used to think it was. Five hundred years ago, a European could look around his world and believe he truly understood much of what he saw; what he could not see was not meant to be understood. Animals and plants, it was supposed, looked as they always had and always would. The rivers and oceans, mountains and deserts were just where they always had been. European man was the highest creature, created to rule the planet; woman was made to be his helpmate in the background, raising his children and always there to provide solace and a hot meal. It was a comfortable world to believe in, but it could not last. In the seventeenth century, people started asking why things were as they were, and how they got to be that way.

It took more than a century for natural historians and scientists to break through the established ideas of European thought. In the early nineteenth century, Charles Lyell, a British geologist, showed that even the earth's appearance is not fixed for all time; its topography is slowly but constantly changing. Charles Darwin and Alfred Russel Wallace proposed a theory of organic evolution that not only accounted for the diversity of life, but also suggested that life changes over time in response to the demands of the environment. Nowhere was the change more drastic than in the way humans viewed themselves. An important consequence of the Age of Discovery in the sixteenth century was that returning explorers brought reports about the great variety of other human societies and races. Europeans, however, believed that their way of life was the ideal way; their ideological and social systems were the best; and they alone had been created in God's image. It was understandably unsettling to hear that human existence was as diverse as wildflowers in the fields. The idea that humans, like other animals, had descended from more primitive forms was anathema to many nineteenth-century minds.

People in Europe were fascinated by the tales the travelers brought back of peoples living in strange lands with even stranger ways of life. Many individuals from Africa and the Americas were exhibited to incredulous Europeans (Figure 1.1). The strangers were regarded as imperfect copies of their European counterparts in social organization, religious thought, and physical appearance. The French natural historian, Georges de Buffon (1707–1788), described the Native American: "Although the



Figure 1.1. *Columbus at the court of Barcelona. His reception took place in February 1493; in addition to six Indians, he brought back many items, including their mineral products, food, and clothing.*

savage of the New World is about the same height as man in our world, this does not suffice for him to constitute an exception to the general fact that all living nature has become smaller on that continent. The savage is feeble, he has neither hair nor beard, and no ardor whatever for his female; although swifter than the European because he is better accustomed to running, he is, on the other hand, less strong in body; he is also less sensitive. . . .^{1*}

Buffon's inaccurate knowledge of Native American populations did not discourage him from describing them in derogatory terms. Fortunately, other European and American writers were not so biased, and they compiled accurate data on the living patterns of non-Europeans. Information, both biased and unbiased, on the variation among human populations around the world was gathered throughout the eighteenth and nineteenth centuries. The modern science of anthropology began with the attempts to understand and relate these accumulated data.

*See page 561 for notes to Chapter 1.

The word anthropology is a fairly modern compound of two ancient Greek words (anthropos = man; logia = study of) that was first used in the sixteenth century, although humans were studied long before the subject had a name (Figure 1.2). Travelers could not help noticing differences in behavior, physical appearance, and technologies. The ancient Greeks and later the Romans wrote vast studies about the habits and manners of their neighbors. Like the later Europeans, their comparisons of culture and appearance were usually flattering to themselves. The Roman historian Tacitus (55–120 A.D.), one of the earliest to compose a study that might be called anthropological, described the Germans of his time in terms very similar to those Buffon applied to Native Americans seventeen centuries later. Of one tribe he said that “all are dirty and lethargic: the faces of the chiefs, too, . . . wear to some extent the degraded aspects” of other German tribes.²

Early writers compared all other people and their cultures to their own; they considered any differences to be signs of imperfection in the other group. It has taken anthropologists a long time to alter the ethnocentrism, or cultural self-centeredness, expressed in these early studies.

Today we understand that human groups, living in their very different environments, must use many means to survive. Anthropologists study the dynamic interaction among human cultures, biologies, and environments. For them to speak of “inferior” or “superior” societies or races is pointless. Success is wholly relative; anthropologists measure it by the human group’s ability to adapt, biologically and culturally, to the demands its environment makes. As a scientific discipline, anthropology covers a very broad range of investigation; it is divided into four subfields, each examining humans from a slightly different angle, yet working with similar assumptions. The subfields are called cultural, linguistic, archaeological, and physical anthropology. Each documents the dynamic process of adaptation in an effort to explain why some attributes are found in some environments but not in others. Humans are in some ways the most complex organisms on the planet; if we wish truly to understand ourselves, why we look and behave as we do, we need the resources that all four anthropological specialties can contribute.

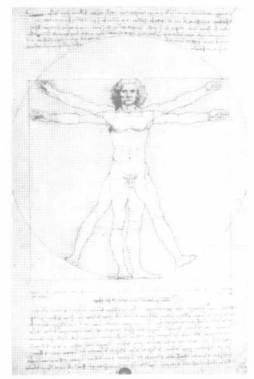


Figure 1.2. The famous drawing of man, by Leonardo Da Vinci (1452–1519), illustrates European concerns in the fifteenth and sixteenth centuries. His work provided an important source for later biological and physical scientists.

Most early cultural anthropologists spent their working lives recording the ways of life of “primitive peoples.” By the late nineteenth century, however, some observers realized that many non-western human cultures in the Pacific, the Americas, Australia, Africa, and many parts of Asia were disintegrating under the impact of European colonialism and technology. Anthropologists undertook “salvage” work to rescue all that remained of the traditional crafts, languages, and social relationships. Since that time, many of the cultures have in fact ceased to exist; they survive only in the records of field anthropologists. In some cases, disease, genocide, and the helplessness created by cultural collapse have resulted in the elimination of not only the culture, but also the people themselves.

Cultural Anthropology

Recently, cultural anthropologists have also begun to investigate modern technological societies, adapting the field techniques developed in studying primitive groups. The most important is participant observation: an anthropologist studies a society by living among the people, using the language, and attempting to understand what it means to be a member of that group.

Among the things a cultural anthropologist wants to discover is which kinds of behavior people in the society believe is appropriate. The anthropologist asks: What is normal, accepted behavior? Children learn these normative behaviors during the process of socialization. By the time they reach adulthood they know, but usually not consciously, what they must do to meet the expectations of others in their culture. The individual follows the traditions of the group, worships the correct gods in the proper way, marries the right person, farms the right crops in the acceptable fashion, and hunts the right animals during the correct season. Employing these learned standards of acceptable behavior, individuals behave in ways that have worked well in the past in that environment; they also carry the culture on to following generations.

Human culture, then, is based on learned behavior, which can be modified in response to changes in the environment. Such innovations in behavior are important to the cultural anthropologist, for they ultimately alter the culture.

Cultural change can profoundly alter a population's biology. In a society based on agriculture that, for economic reasons, suddenly shifts from growing food crops the people can eat to a cash crop they can sell, such as cotton, diet and health may suffer. New patterns of migration can expose the migrants to new diseases, diets, and choices of possible mates.

The group's biology can also affect the culture. People who are starving do not behave like those who are well fed. Biological and cultural changes are interdependent. By analyzing how human cultures try to cope with the environment while keeping social groups stable, cultural anthropologists help us immensely in understanding humans.

Linguistic Anthropology

Linguistic anthropologists also study human behavior. The development of their field, like that of cultural anthropologists, accelerated when they found they had to transcribe many non-western spoken languages before those languages disappeared. Anthropological linguists helped preserve many of these languages. Analyzing them for their common elements can help reveal, among other things, biological relationships among the speakers.

All human beings are capable of learning to use language, that is, a spoken, open-ended communication system. At about eighteen to twenty-eight months, a child usually will begin spontaneously — without parental guidance or help — to learn to speak the language it hears being used around it. By open-ended we mean that language can communicate any concrete or abstract thought the speaker wants to get across,

even if the thought has never been said before. All human languages are capable of communicating any thought or feeling within the culture; “primitive” groups do not have “simple” languages.

Starting in the 1950s, Noam Chomsky and his associates expanded the study of language with a far-reaching theory. According to this theory, a speaker who knows the structure of language and has a vocabulary can generate an infinite number of grammatically correct and understandable sentences. This ability is founded in structures in the human brain and vocal cord system — there is a biological basis for language capability — and its development was crucial for our evolution, for only with an open communication system could human cultures evolve.

Linguists are also interested in the naturally occurring communication systems evidenced by our close animal relatives, and in addition they have recently attempted to teach true languages to apes. We will return to this subject in Chapter 7.

Prehistoric archaeology, another part of anthropology, extends the study of cultural anthropology back through time. The remains of past human cultural activity are a message the archaeologist tries to decipher; they can tell us how extinct societies interacted with their environment, the dynamic interaction between a human society and its environment which results in the long-term successful adaptation of that culture in that place. Unfortunately, what is normally left of past cultures are the remnants of technology, such as stone and bone tools, pottery, broken animal bones, and fire-blackened rock. Given this very incomplete record to work with, archaeologists increasingly have turned to sophisticated methods of analysis to discover every bit of evidence they can about an ancient culture. Even with this help they can do little to reconstruct social systems, religious beliefs, and marriage practices from the few scraps left in the ground after a culture disappears. Sometimes the archaeologist must draw conclusions from what is not present, gaining insight, for example, into the nature of our very earliest direct ancestors from the absence of burials, fire, and other signs of complex behavior.

In reconstructing extinct cultures, archaeologists can use the data amassed by cultural and physical anthropologists. Some groups living today do not get their food by farming but by gathering vegetables, fruits, insects, and birds’ eggs, and by hunting animals. Until agriculture was invented about 10,000 years ago, all human cultures were based on this economic level; thus many sites an archaeologist investigates contain the remains of gatherers and hunters. By understanding how modern gatherers and hunters handle the problems in their way of life, researchers can reconstruct and help us understand prehistoric cultures. Conversely, besides documenting the material remains of extinct groups, such as behavioral reconstructions help us to better understand modern peoples. Insights into cultural development help us explain why people today show particular biological and cultural attributes. The archaeological data can

Archaeological Anthropology