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Anthropology Today: Anthropologist's Son
Elected President

“That’s just human nature.” “People are pretty much the same all over the world.” Such opinions, which we hear in conversations, in the mass media, and in a dozen scenes in daily life, promote the erroneous idea that people in other countries have the same desires, feelings, values, and aspirations that we do. Such statements proclaim that because people are essentially the same, they are eager to receive the ideas, beliefs, values, institutions, practices, and products of an expansive North American culture. Often this assumption turns out to be wrong.

Anthropology offers a broader view—a distinctive comparative, cross-cultural perspective. Most people think that anthropologists study nonindustrial societies, and they do. My research has taken me to remote villages in Brazil and Madagascar, a large island off the southeast coast of Africa. In Brazil I sailed with fishers in simple sailboats on Atlantic waters. Among Madagascar’s Betsileo people I worked in rice fields and took part in ceremonies in which I entered tombs to rewrap the corpses of decaying ancestors.

However, anthropology is much more than the study of nonindustrial peoples. It is a comparative science that examines all societies, ancient and modern, simple and complex. Most of the other social sciences tend to focus on a single society, usually an industrial nation such as the United States or Canada. Anthropology offers a unique cross-cultural perspective, constantly comparing the customs of one society with those of others.

To become a cultural anthropologist, one normally does *ethnography* (the first-hand, personal study of local settings). Ethnographic fieldwork usually entails spending a year or more in another society, living with the local people and learning about

their way of life. No matter how much the ethnographer discovers about the society, he or she remains an alien there. That experience of alienation has a profound impact. Having learned to respect other customs and beliefs, anthropologists can never forget that there is a wider world. There are normal ways of thinking and acting other than our own.

Human Adaptability

Anthropologists study human beings wherever and whenever they find them—in a Turkish café, a Mesopotamian tomb, or a North American shopping mall. Anthropology is the exploration of human diversity in time and space. Anthropology studies the whole of the human condition: past, present, and future; biology, society, language, and culture. Of particular interest is the diversity that comes through human adaptability.

Humans are among the world's most adaptable animals. In the Andes of South America, people wake up in villages 16,000 feet above sea level and then trek 1,500 feet higher to work in tin mines. Tribes in the Australian desert worship animals and discuss philosophy. People survive malaria in the tropics. Men have walked on the moon. The model of the starship *Enterprise* in Washington's Smithsonian Institution symbolizes the desire to “seek out new life and civilizations, to boldly go where no one has gone before.” Wishes to know the unknown, control the uncontrollable, and create order out of chaos find expression among all peoples. Creativity, adaptability, and flexibility are basic human attributes, and human diversity is the subject matter of anthropology.

Students often are surprised by the breadth of **anthropology**, which is the study of the human species and its immediate ancestors. Anthropology is a uniquely comparative and **holistic** science. Holism refers to the study of the whole of the human condition: past, present, and future; biology, society, language, and culture.

People share *society*—organized life in groups—with other animals, including baboons, wolves, and even ants. Culture, however, is more distinctly human. **Cultures** are traditions and customs, transmitted through learning, that form and guide the beliefs and behavior of the people exposed to them. Children learn such a tradition by growing up in a particular society, through a process called enculturation. Cultural traditions include customs and opinions, developed over the generations, about proper and improper behavior. These traditions answer such questions as: How should we do things? How do we make sense of the world? How do we tell right from wrong? What is right, and what is wrong? A culture produces a degree of consistency in behavior and thought among the people who live in a particular society.

The most critical element of cultural traditions is their transmission through learning rather than through biological inheritance. Culture is not itself biological, but it rests on certain features of human biology. For more than a million years, humans have had at least some of the biological capacities on which culture depends. These abilities are to learn, to think symbolically, to use language, and to employ tools and other products in organizing their lives and adapting to their environments.

Anthropology confronts and ponders major questions of human existence as it explores human biological and cultural diversity in time and space. By examining

ancient bones and tools, we unravel the mysteries of human origins. When did our ancestors separate from those remote great-aunts and great-uncles whose descendants are the apes? Where and when did *Homo sapiens* originate? How has our species changed? What are we now, and where are we going? How have changes in culture and society influenced biological change? Our genus, *Homo*, has been changing for more than 1 million years. Humans continue to adapt and change both biologically and culturally.

Adaptation, Variation, and Change

Adaptation refers to the processes by which organisms cope with environmental forces and stresses, such as those posed by climate and *topography* or terrains, also called landforms. How do organisms change to fit their environments, such as dry climates or high mountain altitudes? Like other animals, humans use biological means of adaptation. But humans are unique in also having cultural means of adaptation. Table 1.1 summarizes the cultural and biological means that humans use to adapt to high altitudes.

Mountainous terrains pose particular challenges, those associated with high altitude and oxygen deprivation. Consider four ways (one cultural and three biological) in which humans may cope with low oxygen pressure at high altitudes. Illustrating cultural (technological) adaptation would be a pressurized airplane cabin equipped with oxygen masks. There are three ways of adapting biologically to high altitudes: genetic adaptation, long-term physiological adaptation, and short-term physiological adaptation. First, native populations of high-altitude areas, such as the Andes of Peru and the Himalayas of Tibet and Nepal, seem to have acquired certain genetic advantages

TABLE 1.1

Forms of Cultural and Biological Adaptation (to High Altitude)

Form of Adaptation	Type of Adaptation	Example
Technology	Cultural	Pressurized airplane cabin with oxygen masks
Genetic adaptation (occurs over generations)	Biological	Larger “barrel chests” of native highlanders
Long-term physiological adaptation (occurs during growth and development of the individual organism)	Biological	More efficient respiratory system, to extract oxygen from “thin air”
Short-term physiological adaptation (occurs spontaneously when the individual organism enters a new environment)	Biological	Increased heart rate, hyperventilation

for life at very high altitudes. The Andean tendency to develop a voluminous chest and lungs probably has a genetic basis. Second, regardless of their genes, people who grow up at a high altitude become physiologically more efficient there than genetically similar people who have grown up at sea level would be. This illustrates long-term physiological adaptation during the body's growth and development. Third, humans also have the capacity for short-term or immediate physiological adaptation. Thus, when lowlanders arrive in the highlands, they immediately increase their breathing and heart rates. Hyperventilation increases the oxygen in their lungs and arteries. As the pulse also increases, blood reaches their tissues more rapidly. All these varied adaptive responses—cultural and biological—achieve a single goal: maintaining an adequate supply of oxygen to the body.

As human history has unfolded, the social and cultural means of adaptation have become increasingly important. In this process, humans have devised diverse ways of coping with the range of environments they have occupied in time and space. The rate of cultural adaptation and change has accelerated, particularly during the past 10,000 years. For millions of years, hunting and gathering of nature's bounty—*foraging*—was the sole basis of human subsistence. However, it took only a few thousand years for **food production** (the cultivation of plants and domestication of animals), which originated some 12,000–10,000 years ago, to replace foraging in most areas. Between 6000 and 5000 B.P. (before the present), the first civilizations arose. These were large, powerful, and complex societies, such as ancient Egypt, that conquered and governed large geographic areas.

Much more recently, the spread of industrial production has profoundly affected human life. Throughout human history, major innovations have spread at the expense of earlier ones. Each economic revolution has had social and cultural repercussions. Today's global economy and communications link all contemporary people, directly or indirectly, in the modern world system. People must cope with forces generated by progressively larger systems—region, nation, and world. The study of such contemporary adaptations generates new challenges for anthropology: “The cultures of world peoples need to be constantly rediscovered as these people reinvent them in changing historical circumstances” (Marcus and Fischer 1986, p. 24).

General Anthropology

The academic discipline of anthropology, also known as **general anthropology** or “four-field” anthropology, includes four main subdisciplines or subfields. They are sociocultural, archaeological, biological, and linguistic anthropology. (From here on, the shorter term *cultural anthropology* will be used as a synonym for “sociocultural anthropology.”) Of the subfields, cultural anthropology has the largest membership. Most departments of anthropology teach courses in all four subfields.

There are historical reasons for the inclusion of four subfields in a single discipline. The origin of anthropology as a scientific field, and of American anthropology in particular, can be traced to the nineteenth century. Early American anthropologists were concerned especially with the history and cultures of the native peoples of North America. Interest in the origins and diversity of Native Americans brought together



Early American anthropology was especially concerned with the history and cultures of Native North Americans. Ely S. Parker, or Ha-sano-an-da, was a Seneca Indian who made important contributions to early anthropology. Parker also served as Commissioner of Indian Affairs for the United States.

studies of customs, social life, language, and physical traits. Anthropologists still are pondering such questions as, Where did Native Americans come from? How many waves of migration brought them to the New World? What are the linguistic, cultural, and biological links among Native Americans and between them and Asia? (Note that a unified four-field anthropology did not develop in Europe, where the subfields tend to exist separately.)

There also are logical reasons for the unity of American anthropology. Each subfield considers variation in time and space (that is, in different geographic areas). Cultural and archaeological anthropologists study (among many other topics) changes in social life and customs. Archaeologists use studies of living societies to imagine what life might have been like in the past. Biological anthropologists examine evolutionary changes in physical form, for example, anatomical changes that might have been associated with the origin of tool use or language. Linguistic anthropologists may reconstruct the basics of ancient languages by studying modern ones.

The subfields influence each other as anthropologists talk to each other, read books and journals, and meet in professional organizations. Anthropologists share certain key assumptions. Perhaps the most fundamental is the idea that sound conclusions about “human nature” cannot be derived from studying a single population, nation, society, or cultural tradition. A comparative, cross-cultural approach is essential.

General anthropology explores the basics of human biology, society, and culture and considers their interrelations. The four-field approach has been particularly effective in examining the relation between biology (e.g., “race”—see below) and culture. About 70 years ago, the famed anthropologist Ruth Benedict realized, “In World history, those who have helped to build the same culture are not necessarily of one race, and those of the same race have not all participated in one culture” (Benedict 1940, Ch. 2). This statement is even truer in today’s globalizing world. How do contemporary anthropologists deal with issues of human biological diversity and race?

Human Biological Diversity and the Race Concept

The photos in this book offer only a glimpse of the range of human biological variation. Additional illustration comes from your own experience. Look around you in your classroom or library, or at the mall or multiplex. Inevitably you’ll see people whose ancestors lived in many lands. The first (Native) Americans had to cross a land bridge that once

linked Siberia to North America. For later immigrants, perhaps including your own parents or grandparents, the voyage may have been across the sea or overland from nations to the south. They came for many reasons. Some came voluntarily, while others were brought here in chains. The scale of migration in today's world is so vast that millions of people routinely cross national borders or live far from the homelands of their grandparents. Now meeting every day are diverse human beings whose biological features reflect adaptation to a wide range of environments other than the ones they now inhabit. Physical contrasts are evident to anyone. Anthropology's job is to explain them.

Historically, scientists have approached the study of human biological diversity in two main ways: (1) racial classification (now largely abandoned) versus (2) the current explanatory approach, which focuses on understanding specific differences. First we'll consider problems with **racial classification** (the attempt to assign humans to discrete categories [purportedly] based on common ancestry). Then we'll offer some explanations for specific aspects of human biological diversity (in this case light versus dark skin color). *Biological differences are real, important, and apparent to us all.* Modern scientists find it most productive to seek *explanations* for this diversity, rather than trying to pigeonhole people into categories called races.

What is race anyway? In theory, a biological race would be a geographically isolated subdivision of a species. (A *species* is a population whose members can interbreed to produce offspring that can live and reproduce.) Such a *subspecies* would be capable of interbreeding with other subspecies of the same species, but it would not actually do so because of its geographic isolation. Some biologists also use "race" to refer to "breeds," as of dogs or roses. Thus, a pit bull and a Chihuahua would be different races of dogs. Such domesticated "races" have been bred by humans for generations. Humanity (*Homo sapiens*) lacks such races because human populations have not been isolated enough from one another to develop into such discrete groups. Nor have humans experienced controlled breeding like that which has created the various kinds of dogs and roses.

A race is supposed to reflect shared *genetic* material (inherited from a common ancestor), but early scholars instead used *phenotypical* traits (usually skin color) for human racial classification. **Phenotype** refers to an organism's evident traits, its "manifest biology"—anatomy and physiology. Humans display hundreds of evident (detectable) physical traits. They range from skin color, hair form, eye color, and facial features (which are visible) to blood groups and enzyme production (which become evident through testing).

Racial classifications based on phenotype raise the problem of deciding which traits are most important. Should races be defined by height, weight, body shape, facial features, teeth, skull form, or skin color? Like their fellow citizens, early European and American scientists gave priority to skin color. Many school books and encyclopedias still proclaim the existence of three great races: the white, the black, and the yellow. This overly simplistic classification was compatible with the political use of race during the colonial period of the late 19th and early 20th centuries. Such a tripartite scheme kept white Europeans neatly separate from their African, Asian, and Native American subjects. Colonial empires began to break up, and scientists began to question established racial categories, after World War II.



The photos in this chapter illustrate only a small part of the range of human biological diversity. Shown above is a woman from Guangzhou province, People's Republic of China.



A young man from the Marquesas Islands in Polynesia.



A Native American: a Chiquitanos Indian woman from Bolivia.



A Native Australian.

Politics aside, one obvious problem with such racial labels is that they don't accurately describe skin color. "White" people are more pink, beige, or tan than white. "Black" people are various shades of brown, and "yellow" people are tan or beige. These terms also have been dignified by more scientific-sounding synonyms—Caucasoid, Negroid, and Mongoloid—which actually have no more of a scientific basis than do white, black, and yellow.

It's true also that many human populations don't fit neatly into any one of the three "great races." For example, where does one put the Polynesians? *Polynesia* is a triangle of South Pacific islands formed by Hawaii to the north, Easter Island to the east, and New Zealand to the southwest. Does the bronze skin color of Polynesians place them with the Caucasoids or the Mongoloids? Some scientists, recognizing this problem, enlarged the original tripartite scheme to include the Polynesian race. Native Americans present an additional problem. Are they red or yellow? Again, some scientists add a fifth race—the red, or Amerindian—to the major racial groups.

Many people in southern India have dark skins, but scientists have been reluctant to classify them with black Africans because of their Caucasoid facial features and hair form. Some, therefore, have created a separate race for these people. What about the Australian aborigines, hunters and gatherers native to the most isolated continent? By skin color, one might place some Native Australians in the same race as tropical Africans. However, similarities to Europeans in hair color (light or reddish) and facial features have led some scientists to classify them as Caucasoids. But there is no evidence that Australians are closer genetically or historically to either of these groups than they are to Asians. Recognizing this problem, scientists often regard Native Australians as a separate race.

Finally, consider the San ("Bushmen") of the Kalahari Desert in southern Africa. Scientists have perceived their skin color as varying from brown to yellow. Those who regard San skin as yellow have placed them in the same category as Asians. In theory, people of the same race share more recent common ancestry with each other than they do with any others; but there is no evidence for recent common ancestry between San and Asians. More reasonably, the San are classified as members of the Capoid (from the Cape of Good Hope) race, which is seen as being different from other groups inhabiting tropical Africa.

Similar problems arise when any single trait is used as a basis for racial classification. An attempt to use facial features, height, weight, or any other phenotypical trait is fraught with difficulties. For example, consider the Nilotes, natives of the upper Nile region of Uganda and Sudan. Nilotes tend to be tall and to have long, narrow noses. Certain Scandinavians also are tall, with similar noses. Given the distance between their homelands, to classify them as members of the same race makes little sense. There is no reason to assume that Nilotes and Scandinavians are more closely related to each other than either is to shorter (and nearer) populations with different kinds of noses.

Would it be better to base racial classifications on a combination of physical traits? This would avoid some of the problems just discussed, but others would arise. First, skin color, stature, skull form, and facial features (nose form, eye shape, lip thickness) don't go together as a unit. For example, people with dark skin may be tall

or short and have hair ranging from straight to very curly. Dark-haired populations may have light or dark skin, along with various skull forms, facial features, and body sizes and shapes. The number of combinations is very large, and the amount that heredity (versus environment) contributes to such phenotypical traits is often unclear.

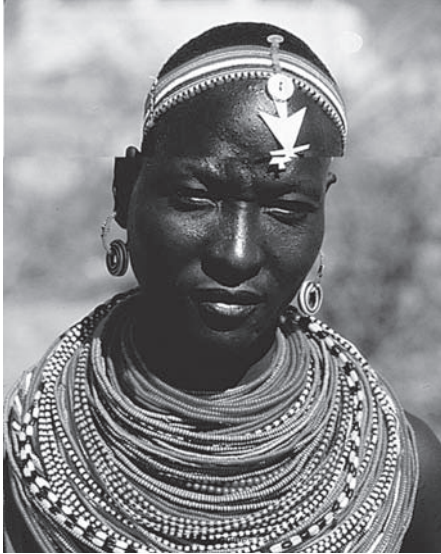
There is a final objection to racial classification based on phenotype. The phenotypical characteristics on which races are based supposedly reflect genetic material that is shared and that has stayed the same for long periods of time. But phenotypical similarities and differences don't necessarily have a genetic basis. Because of changes in the environment that affect individuals during growth and development, the range of phenotypes characteristic of a population may change without any genetic change. There are several examples. In the early 20th century, the anthropologist Franz Boas (1940/1966) described changes in skull form among the children of Europeans who had migrated to the United States. The reason for this wasn't a change in genes, since the European immigrants tended to marry among themselves. Some of their children had been born in Europe and merely raised in the United States. Something in the new environment, probably in the diet, was producing this change. We know now that changes in average height and weight produced by dietary differences in a few generations are common and have nothing to do with race or genetics.

Anthropology's comparative, biocultural perspective recognizes that environmental factors, including customary diet and other cultural forces, constantly mold human biology. (**Biocultural** refers to the inclusion and combination of both biological and cultural perspectives and approaches to comment on or solve a particular issue or problem.) Culture is a key environmental force in determining how human bodies grow and develop. Cultural traditions promote certain activities and abilities, discourage others, and set standards of physical well-being and attractiveness.

Bodies—ideal, and actual—vary from culture to culture and within one culture over time. Ideal bodies change from generation to generation and, with the influence of the mass media, even from decade to decade. Old movies make it easy for us to study bodies and clothing over time. Such movie stars of the past as Humphrey Bogart and Barbara Stanwyck wore stylish hats and smoked cigarettes. Contemporary American men and women wear baseball caps and lift weights. When asked how he recognized Americans in the street, one European mentioned lifting (of weights, and its effects on the body) and tennis shoes (an item of dress considered inelegant in Europe, but a mainstay of hard-core American touring).

Explanatory Approaches

Traditional racial classification assumed that biological characteristics were determined by heredity and were stable (immutable) over long periods of time. We know now that a biological similarity doesn't necessarily indicate recent common ancestry. Dark skin color, for example, can be shared by tropical Africans and Native Australians for reasons other than common ancestry. It is not possible to *define human races* biologically. Still, scientists have made much progress in *explaining* variation in skin color, along with many other expressions of human biological diversity. We shift now from classification to *explanation*, in which natural selection plays a key role.



Before the 16th century, almost all the very dark-skinned populations of the world lived in the tropics, as does this Samburu woman from Kenya.



Very light skin color, illustrated in the photo above, maximizes absorption of ultraviolet radiation by those few parts of the body exposed to direct sunlight during northern winters. This helps prevent rickets and osteoporosis.

First recognized by Charles Darwin and Alfred Russel Wallace, **natural selection** is the process by which the forms most fit to survive and reproduce in a given environment—such as the tropics—do so in greater numbers than others in the same population do. Over the years, the less fit organisms die out and the favored types survive by producing more offspring. The role of natural selection in producing variation in skin color will illustrate the explanatory approach to human biological diversity. Comparable explanations have been provided for many other aspects of human biological variation.

Melanin, the primary determinant of human skin color, is a chemical substance manufactured in the epidermis, or outer skin layer. The melanin cells of darker-skinned people produce more and larger granules of melanin than do those of lighter-skinned people. By screening out ultraviolet (UV) radiation from the sun, melanin offers protection against a variety of maladies, including sunburn and skin cancer.

Before the 16th century, most of the world's very dark-skinned populations lived in the **tropics**, a belt extending about 23 degrees north and south of the equator, between the Tropic of Cancer and the Tropic of Capricorn. The association between dark skin color and a tropical habitat existed throughout the Old World, where humans and their ancestors have lived for millions of years. The darkest populations of Africa evolved not in shady equatorial forests but in sunny open grassland, or savanna, country.

Outside the tropics, skin color tends to be lighter. Moving north in Africa, for example, there is a gradual transition from dark brown to medium brown. Average skin color continues to lighten as one moves through the Middle East, into southern Europe,

through central Europe, and to the north. South of the tropics skin color also is lighter. In the Americas, by contrast, tropical populations don't have very dark skin. This is because the settlement of the New World, by light-skinned Asian ancestors of Native Americans, was relatively recent, probably dating back no more than 18,000 years.

How, aside from migrations, can we explain the geographic distribution of human skin color? Natural selection provides an answer. In the tropics, intense UV radiation poses a series of threats that make light skin color an adaptive disadvantage. First, UV radiation can cause severe sunburn, which aside from discomfort can lead to vulnerabilities in the body. By damaging sweat glands, sunburn reduces the body's ability to perspire and thus to regulate its own temperature (thermoregulation). Sunburn also can increase susceptibility to disease. Yet another disadvantage of having light skin color in the tropics is that exposure to UV radiation can cause skin cancer (Blum 1961). Melanin, nature's own sunscreen, confers a selective advantage (i.e., a better chance to survive and reproduce) on darker-skinned people living in the tropics because it helps protect them from sunburn and skin cancer.

Another selective factor in the geographic distribution of human skin color relates to the manufacture (synthesis) of vitamin D in the body. Years ago, W. F. Loomis (1967) focused on the role of UV radiation in stimulating the manufacture of vitamin D by the human body. The unclothed human body can produce its own vitamin D when exposed to sufficient sunlight. However, in a cloudy environment that also is so cold that people have to dress themselves much of the year (such as northern Europe, where very light skin color evolved), clothing interferes with the body's manufacture of vitamin D. The ensuing shortage of vitamin D diminishes the absorption of calcium in the intestines. A nutritional disease known as rickets, which softens and deforms the bones, may develop. In women, deformation of the pelvic bones from rickets can interfere with childbirth. In cold northern areas, light skin color maximizes the absorption of UV radiation and the synthesis of vitamin D by the few parts of the body that are exposed to direct sunlight. There has been selection against dark skin color in northern areas because melanin screens out UV radiation.

This natural selection continues today: East Asians who have migrated recently from India and Pakistan to northern areas of the United Kingdom have a higher incidence of rickets and osteoporosis (also related to vitamin D and calcium deficiency) than the general British population. A related illustration involves Eskimos (Inuit) and other indigenous inhabitants of northern Alaska and northern Canada. According to Nina Jablonski (quoted in Iqbal 2002), "Looking at Alaska, one would think that the native people should be pale as ghosts." One reason they aren't is that they haven't inhabited this region very long in terms of geological time. Even more important, their traditional diet, which is rich in seafood, including fish oils, supplies sufficient vitamin D so as to make a reduction in pigmentation unnecessary. However, and again illustrating natural selection at work today, "when these people don't eat their aboriginal diets of fish and marine mammals, they suffer tremendously high rates of vitamin D-deficiency diseases such as rickets in children and osteoporosis in adults" (Jablonski quoted in Iqbal 2002). Far from being immutable, skin color can become an evolutionary liability very quickly.

According to Jablonski and George Chaplin (2000), another key factor explaining the geographic distribution of skin color involves the effects of UV on folate, an essential nutrient that the human body manufactures from folic acid. Folate is needed for

cell division and the production of new DNA. Pregnant women require large amounts of folate to support rapid cell division in the embryo, and there is a direct connection between folate and individual reproductive success. Folate deficiency causes neural tube defects (NTDs) in human embryos. NTDs are marked by the incomplete closure of the neural tube, so the spine and spinal cord fail to develop completely. One NTD, anencephaly (with the brain an exposed mass), results in stillbirth or death soon after delivery. With spina bifida, another NTD, survival rates are higher, but babies have severe disabilities, including paralysis. NTDs are the second-most-common human birth defect after cardiac abnormalities. Today, women of reproductive age are advised to take folate supplements to prevent serious birth defects such as spina bifida.

Natural sunlight and UV radiation destroy folate in the human body. Because melanin, as we have seen, protects against UV hazards, such as sunburn and its consequences, dark skin coloration is adaptive in the tropics. Now we see that melanin also is adaptive because it conserves folate in the human body and thus protects against NTDs, which are much more common in light-skinned than in darker-skinned populations (Jablonski and Chaplin 2000). Studies confirm that Africans and African Americans have a low incidence of severe folate deficiency, even among individuals with marginal nutritional status. Folate also plays a role in another process that is central to reproduction, spermatogenesis—the production of sperm. In mice and rats, folate deficiency can cause male sterility; it may well play a similar role in humans.

Today, of course, cultural alternatives to biological adaptation permit light-skinned people to survive in the tropics and darker-skinned people to live in the far north. People can clothe themselves and seek shelter from the sun; they can use artificial sunscreens if they lack the natural protection that melanin provides. Dark-skinned people living in the north can, indeed must, get vitamin D from their diet or take supplements. Today, pregnant women are routinely advised to take folic acid or folate supplements as a hedge against NTDs. Even so, light skin color still is correlated with a higher incidence of spina bifida.

Jablonski and Chaplin (2000) explain variation in human skin color as resulting from a balancing act between the evolutionary needs to (1) protect against all UV hazards (favoring dark skin in the tropics) and (2) have an adequate supply of vitamin D (favoring lighter skin outside the tropics). This discussion of skin color shows that common ancestry, the presumed basis of race, is not the only reason for biological similarities. Natural selection, still at work today, makes a major contribution to variations in human skin color, as well as to many other human biological differences and similarities.

The Subdisciplines of Anthropology

Cultural Anthropology

Cultural anthropology is the study of human society and culture, the subfield that describes, analyzes, interprets, and explains social and cultural similarities and differences. To study and interpret cultural diversity, cultural anthropologists engage in two kinds of activity: ethnography (based on field work) and ethnology (based on cross-cultural comparison). **Ethnography** provides an account of a particular community,

society, or culture. During ethnographic fieldwork, the ethnographer gathers data that he or she organizes, describes, analyzes, and interprets to build and present that account, which may be in the form of a book, article, or film. Traditionally, ethnographers have lived in small communities and studied local behavior, beliefs, customs, social life, economic activities, politics, and religion (see Wolcott 2008).

The anthropological perspective derived from ethnographic field work often differs radically from that of economics or political science. Those fields focus on national and official organizations and policies and often on elites. However, the groups that anthropologists traditionally have studied usually have been relatively poor and powerless. Ethnographers often observe discriminatory practices directed toward such people, who experience food shortages, dietary deficiencies, and other aspects of poverty. Political scientists tend to study programs that national planners develop, while anthropologists discover how these programs work on the local level.

Cultures are not isolated. As noted by Franz Boas (1940/1966) many years ago, contact between neighboring tribes always has existed and has extended over enormous areas.” Human populations construct their cultures in interaction with one another, and not in isolation” (Wolf 1982, p. ix). Villagers increasingly participate in regional, national, and world events. Exposure to external forces comes through the mass media, migration, and modern transportation. City and nation increasingly invade local communities with the arrival of tourists, development agents, government and religious officials, and political candidates. Such linkages are prominent components of regional, national, and international systems of politics, economics, and information. These larger systems increasingly affect the people and places anthropology traditionally has studied. The study of such linkages and systems is part of the subject matter of modern anthropology.

Ethnology examines, interprets, analyzes, and compares the results of ethnography—the data gathered in different societies. It uses such data to compare and contrast and to make generalizations about society and culture. Looking beyond the particular to the more general, ethnologists attempt to identify and explain cultural differences and similarities, to test hypotheses, and to build theory to enhance our understanding of how social and cultural systems work. Ethnology gets its data for comparison not just from ethnography but also from the other subfields, particularly from archaeological anthropology, which reconstructs social systems of the past. (Table 1.2 summarizes the main contrasts between ethnography and ethnology.)

TABLE 1.2

Ethnography and Ethnology—Two Dimensions of Cultural Anthropology

Ethnography	Ethnology
Requires field work to collect data	Uses data collected by a series of researchers
Often descriptive	Usually synthetic
Group/community specific	Comparative/cross-cultural

Archaeological Anthropology

Archaeological anthropology (more simply, “archaeology”) reconstructs, describes, and interprets human behavior and cultural patterns through material remains. At sites where people live or have lived, archaeologists find artifacts, material items that humans have made, used, or modified, such as tools, weapons, camp sites, buildings, and garbage. Plant and animal remains and ancient garbage tell stories about consumption and activities. Wild and domesticated grains have different characteristics, which allow archaeologists to distinguish between gathering and cultivation. Examination of animal bones reveals the ages of slaughtered animals and provides other information useful in determining whether species were wild or domesticated.

Analyzing such data, archaeologists answer several questions about ancient economies. Did the group get its meat from hunting, or did it domesticate and breed animals, killing only those of a certain age and sex? Did plant food come from wild plants or from sowing, tending, and harvesting crops? Did the residents make, trade for, or buy particular items? Were raw materials available locally? If not, where did they come from? From such information, archaeologists reconstruct patterns of production, trade, and consumption.

Archaeologists have spent much time studying potsherds, fragments of earthenware. Potsherds are more durable than many other artifacts, such as textiles and wood. The quantity of pottery fragments allows estimates of population size and density. The discovery that potters used materials that were not available locally suggests systems



An archaeological team works at Harappa, one site from an ancient Indus River civilization dating back some 4,800 years.

of trade. Similarities in manufacture and decoration at different sites may be proof of cultural connections. Groups with similar pots may be historically related. Perhaps they shared common cultural ancestors, traded with each other, or belonged to the same political system.

Many archaeologists examine paleoecology. *Ecology* is the study of interrelations among living things in an environment. The organisms and environment together constitute an *ecosystem*, a patterned arrangement of energy flows and exchanges. Human ecology studies ecosystems that include people, focusing on the ways in which human use “of nature influences and is influenced by social organization and cultural values” (Bennett 1969, pp. 10–11). *Paleoecology* looks at the ecosystems of the past.

In addition to reconstructing ecological patterns, archaeologists may infer cultural transformations, for example, by observing changes in the size and type of sites and the distance between them. A city develops in a region where only towns, villages, and hamlets existed a few centuries earlier. The number of settlement levels (city, town, village, hamlet) in a society is a measure of social complexity. Buildings offer clues about political and religious features. Temples and pyramids suggest that an ancient society had an authority structure capable of marshaling the labor needed to build such monuments. The presence or absence of certain structures, like the pyramids of ancient Egypt and Mexico, reveals differences in function between settlements. For example, some towns were places where people came to attend ceremonies. Others were burial sites; still others were farming communities.

Archaeologists also reconstruct behavior patterns and lifestyles of the past by excavating. This involves digging through a succession of levels at a particular site. In a given area, through time, settlements may change in form and purpose, as may the connections between settlements. Excavation can document changes in economic, social, and political activities.

Although archaeologists are best known for studying prehistory, that is, the period before the invention of writing, they also study the cultures of historical and even living peoples (see Sabloff 2008). Studying sunken ships off the Florida coast, underwater archaeologists have been able to verify the living conditions on the vessels that brought ancestral African Americans to the New World as enslaved people. In a research project begun in 1973 in Tucson, Arizona, archaeologist William Rathje has learned about contemporary life by studying modern garbage. The value of “garbology,” as Rathje calls it, is that it provides “evidence of what people did, not what they think they did, what they think they should have done, or what the interviewer thinks they should have done” (Harrison, Rathje, and Hughes 1994, p. 108). What people report may contrast strongly with their real behavior as revealed by garbology. For example, the garbologists discovered that the three Tucson neighborhoods that reported the lowest beer consumption actually had the highest number of discarded beer cans per household (Podolefsky and Brown 1992, p. 100)! Rathje’s garbology also has exposed misconceptions about how much of different kinds of trash are in landfills: While most people thought that fast-food containers and disposable diapers were major waste problems, in fact they were relatively insignificant compared with paper, including environmentally friendly, recyclable paper (Rathje and Murphy 2001).

Biological, or Physical, Anthropology

The subject matter of **biological, or physical, anthropology** is human biological diversity in time and space. The focus on biological variation unites five special interests within biological anthropology:

1. Human evolution as revealed by the fossil record (paleoanthropology).
2. Human genetics.
3. Human growth and development.
4. Human biological plasticity (the body's ability to change as it copes with stresses, such as heat, cold, and altitude).
5. The biology, evolution, behavior, and social life of monkeys, apes, and other nonhuman **primates**.

These interests link physical anthropology to other fields: biology, zoology, geology, anatomy, physiology, medicine, and public health. Osteology—the study of bones—helps paleoanthropologists, who examine skulls, teeth, and bones, to identify human ancestors and to chart changes in anatomy over time. A paleontologist is a scientist who studies fossils. A paleoanthropologist is one sort of paleontologist, one who studies the fossil record of human evolution. Paleoanthropologists often collaborate with archaeologists, who study artifacts, in reconstructing biological and cultural aspects of human evolution. Fossils and tools often are found together. Different types of tools provide information about the habits, customs, and lifestyles of the ancestral humans who used them.

More than a century ago, Charles Darwin noticed that the variety that exists within any population permits some individuals (those with the favored characteristics) to do better than others at surviving and reproducing. Genetics, which developed later, enlightens us about the causes and transmission of this variety. However, it isn't just genes that cause variety. During any individual's lifetime, the environment works along with heredity to determine biological features. For example, people with a genetic tendency to be tall will be shorter if they are poorly nourished during childhood. Thus, biological anthropology also investigates the influence of environment on the body as it grows and matures. Among the environmental factors that influence the body as it develops are nutrition, altitude, temperature, and disease, as well as cultural factors, such as the standards of attractiveness we considered previously.

Biological anthropology (along with zoology) also includes primatology. The primates include our closest relatives—apes and monkeys. Primatologists study their biology, evolution, behavior, and social life, often in their natural environments. Primatology assists paleoanthropology, because primate behavior may shed light on early human behavior and human nature.

Linguistic Anthropology

We don't know (and probably never will) when our ancestors acquired the ability to speak, although biological anthropologists have looked to the anatomy of the face and the skull to speculate about the origin of language. And primatologists have described the communication systems of monkeys and apes. We do know that well-developed, grammatically complex languages have existed for thousands of years. Linguistic anthropology offers further illustration of anthropology's interest in comparison,

variation, and change. **Linguistic anthropology** studies language in its social and cultural context, across space and over time. Some linguistic anthropologists make inferences about universal features of language, linked perhaps to uniformities in the human brain. Others reconstruct ancient languages by comparing their contemporary descendants and in so doing make discoveries about history. Still others study linguistic differences to discover varied perceptions and patterns of thought in different cultures.

Historical linguistics considers variation in time, such as the changes in sounds, grammar, and vocabulary between Middle English (spoken from approximately A.D. 1050 to 1550) and modern English. **Sociolinguistics** investigates relationships between social and linguistic variation. No language is a homogeneous system in which everyone speaks just like everyone else. How do different speakers use a given language? How do linguistic features correlate with social factors, including class and gender differences (Tannen 1990)? One reason for variation is geography, as in regional dialects and accents. Linguistic variation also is expressed in the bilingualism of ethnic groups. Linguistic and cultural anthropologists collaborate in studying links between language and many other aspects of culture, such as how people reckon kinship and how they perceive and classify colors.

Anthropology and Other Academic Fields

As mentioned previously, one of the main differences between anthropology and the other fields that study people is holism, anthropology's unique blend of biological, social, cultural, linguistic, historical, and contemporary perspectives. Paradoxically, while distinguishing anthropology, this breadth is what also links it to many other disciplines. Techniques used to date fossils and artifacts have come to anthropology from physics, chemistry, and geology. Because plant and animal remains often are found with human bones and artifacts, anthropologists collaborate with botanists, zoologists, and paleontologists.

As a discipline that is both scientific and humanistic, anthropology has links with many other academic fields. Anthropology is a **science**—a “systematic field of study or body of knowledge that aims, through experiment, observation, and deduction, to produce reliable explanations of phenomena, with references to the material and physical world” (*Webster's New World Encyclopedia* 1993, p. 937). The following chapters present anthropology as a humanistic science devoted to discovering, describing, understanding, and explaining similarities and differences in time and space among humans and our ancestors. Clyde Kluckhohn (1944) described anthropology as “the science of human similarities and differences” (p. 9). His statement of the need for such a field still stands: “Anthropology provides a scientific basis for dealing with the crucial dilemma of the world today: how can peoples of different appearance, mutually unintelligible languages, and dissimilar ways of life get along peaceably together?” (p. 9). Anthropology has compiled an impressive body of knowledge that this textbook attempts to encapsulate.

Besides its links to the natural sciences (e.g., geology, zoology), and social sciences (e.g., sociology, psychology), anthropology also has strong links to the humanities. The humanities include English, comparative literature, classics, folklore, philosophy, and the arts. These fields study languages, texts, philosophies, arts, music,

performances, and other forms of creative expression. Ethnomusicology, which studies forms of musical expression on a worldwide basis, is especially closely related to anthropology. Also linked is folklore, the systematic study of tales, myths, and legends from a variety of cultures. One might well argue that anthropology is among the most humanistic of all academic fields because of its fundamental respect for human diversity. Anthropologists listen to, record, and represent voices from a multitude of nations and cultures. Anthropology values local knowledge, diverse worldviews, and alternative philosophies. Cultural anthropology and linguistic anthropology in particular bring a comparative and nonelitist perspective to forms of creative expression, including language, art, narratives, music, and dance, viewed in their social and cultural context.

Applied Anthropology

Anthropology is not a science of the exotic carried on by quaint scholars in ivory towers. Rather, anthropology has a lot to tell the public. Anthropology's foremost professional organization, the American Anthropological Association (AAA), has formally acknowledged a public service role by recognizing that anthropology has two dimensions: (1) academic or general anthropology and (2) practicing or **applied anthropology**. The latter refers to the application of anthropological data, perspectives, theory, and methods to identify, assess, and solve contemporary social problems. As Erve Chambers (1987, p. 309) states it, applied anthropology is the "field of inquiry concerned with the relationships between anthropological knowledge and the uses of that knowledge in the world beyond anthropology." More and more anthropologists from the four subfields now work in such "applied" areas as public health, family planning, business, economic development, and cultural resource management.

Applied anthropology encompasses any use of the knowledge and/or techniques of the four subfields to identify, assess, and solve practical problems. Because of anthropology's breadth, it has many applications. For example, applied medical anthropologists consider both the sociocultural and the biological contexts and implications of disease and illness. Perceptions of good and bad health, along with actual health threats and problems, differ among societies. Various ethnic groups recognize different illnesses, symptoms, and causes and have developed different health-care systems and treatment strategies.

Applied archaeology, usually called *public archaeology*, includes such activities as cultural resource management, contract archaeology, public educational programs, and historic preservation. An important role for public archaeology has been created by legislation requiring evaluation of sites threatened by dams, highways, and other construction activities. To decide what needs saving, and to preserve significant information about the past when sites cannot be saved, is the work of **cultural resource management (CRM)**. CRM involves not only preserving sites but also allowing their destruction if they are not significant. The "management" part of the term refers to the evaluation and decision-making process. Cultural resource managers work for federal, state, and county agencies and other clients. Applied cultural anthropologists sometimes work with the public archaeologists, assessing the human problems generated by the proposed change and determining how they can be reduced. Table 1.3 relates anthropology's four subfields to its two dimensions.

TABLE 1.3

The Four Subfields and Two Dimensions of Anthropology

Anthropology's Subfields (General Anthropology)	Examples of Application (Applied Anthropology)
Cultural anthropology	Development anthropology
Archaeological anthropology	Cultural resource management (CRM)
Biological or physical anthropology	Forensic anthropology
Linguistic anthropology	Study of linguistic diversity in classrooms

ANTHROPOLOGY TODAY

Anthropologist's Son Elected President

It is widely known that Barack Obama is the son of a Kenyan father and a White American mother from Kansas. Less recognized is the fact that the 44th president of the United States is the son of an anthropologist—Dr. Stanley Ann Dunham Soetoro (usually called simply Ann Dunham). This account focuses on her life and her attraction to diversity, which led her to a career in anthropology. A sociocultural anthropologist by training, Dunham's work on microfinance and socioeconomic issues affecting Indonesian women illustrates the application of anthropology to identify and solve contemporary problems. In other words, she was both a cultural and an applied anthropologist.

Anthropologists study humanity in varied times and places and in a rapidly changing world. By virtue of his parentage, his enculturation, and his experience abroad, Barack Obama provides an excellent symbol of the diversity and interconnections that characterize such a world. As well, his election is a tribute to an ever more diverse United States of America.



Young Barack Obama with his mother, anthropologist Ann Dunham.

In the capsule version of the Barack Obama story, his mother is simply the white woman from Kansas. . . . On the campaign trail, he has called her his “single mom.” But neither description begins to capture the unconventional life of Stanley

Continued

ANTHROPOLOGY TODAY *Continued*

Ann Dunham Soetoro, the parent who most shaped Mr. Obama. . . .

In Hawaii, she married an African student at age 18. Then she married an Indonesian, moved to Jakarta, became an anthropologist, wrote an 800-page dissertation on peasant blacksmithing in Java, worked for the Ford Foundation, championed women's work and helped bring microcredit to the world's poor.

She had high expectations for her children. In Indonesia, she would wake her son at 4 a.m. for correspondence courses in English before school; she brought home recordings of Mahalia Jackson, speeches by the Rev. Dr. Martin Luther King Jr. And when Mr. Obama asked to stay in Hawaii for high school rather than return to Asia, she accepted living apart—a decision her daughter says was one of the hardest in Ms. Soetoro's life.

"She felt that somehow, wandering through uncharted territory, we might stumble upon something that will, in an instant, seem to represent who we are at the core," said Maya Soetoro-Ng, Mr. Obama's half-sister. "That was very much her philosophy of life—to not be limited by fear or narrow definitions, to not build walls around ourselves and to do our best to find kinship and beauty in unexpected places." . . .

Mr. Obama . . . barely saw his father after the age of 2. Though it is impossible to pinpoint the imprint of a parent on the life of a grown child, people who knew Ms. Soetoro well say they see her influence unmistakably in Mr. Obama. . . .

"She was a very, very big thinker," said Nancy Barry, a former president of Women's World Banking, an international network of microfinance providers, where Ms. Soetoro worked in New York City in the early 1990s. . . .

In a Russian class at the University of Hawaii, she met the college's first African student, Barack Obama. They married and had a son in August 1961, in an era when interracial marriage was rare in the United States. . . .

The marriage was brief. In 1963, Mr. Obama left for Harvard, leaving his wife and child. She then married Lolo Soetoro, an Indonesian student. When he was summoned home in 1966 after the turmoil surrounding the rise of Suharto, Ms. Soetoro and Barack followed. . . .

Her second marriage faded, too, in the 1970s. Ms. Soetoro wanted to work, one friend said, and Mr. Soetoro wanted more children. He became more American, she once said, as she became more Javanese. "There's a Javanese belief that if you're married to someone and it doesn't work, it will make you sick," said Alice G. Dewey, an anthropologist and friend. "It's just stupid to stay married." . . .

By 1974, Ms. Soetoro was back in Honolulu, a graduate student and raising Barack and Maya, nine years younger. . . . When Ms. Soetoro decided to return to Indonesia three years later for her field work, Barack chose not to go. . . .

Fluent in Indonesian, Ms. Soetoro moved with Maya first to Yogyakarta, the center of Javanese handicrafts. A weaver in college, she was fascinated with what Ms. Soetoro-Ng calls "life's gorgeous minutiae." That interest inspired her study of village industries, which became the basis of her 1992 doctoral dissertation.

"She loved living in Java," said Dr. Dewey, who recalled accompanying Ms. Soetoro to a metalworking village. "People said: 'Hi! How are you?' She said: 'How's your wife? Did your daughter have the baby?' They were friends. Then she'd whip out her notebook and she'd say: 'How

many of you have electricity? Are you having trouble getting iron?"

She became a consultant for the United States Agency for International Development on setting up a village credit program, then a Ford Foundation program officer in Jakarta specializing in women's work. Later, she was a consultant in Pakistan, then joined Indonesia's oldest bank to work on what is described as the world's largest sustainable microfinance program, creating services like credit and savings for the poor.

Visitors flowed constantly through her Ford Foundation office in downtown Jakarta and through her house in a neighborhood to the south, where papaya and banana trees grew in the front yard and Javanese dishes . . . were served for dinner. Her guests were leaders in the Indonesian human rights movement, people from women's organizations, representatives of community groups doing grass-roots development . . .

Ms. Soetoro-Ng . . . remembers conversations with her mother about

philosophy or politics, books, esoteric Indonesian woodworking motifs. . .

"She gave us a very broad understanding of the world," her daughter said. "She hated bigotry. She was very determined to be remembered for a life of service and thought that service was really the true measure of a life." Many of her friends see her legacy in Mr. Obama—in his self-assurance and drive, his boundary bridging, even his apparent comfort with strong women. She died in November 1995, as Mr. Obama was starting his first campaign for public office. After a memorial service at the University of Hawaii, one friend said, a small group of friends drove to the South Shore in Oahu. With the wind whipping the waves onto the rocks, Mr. Obama and Ms. Soetoro-Ng placed their mother's ashes in the Pacific, sending them off in the direction of Indonesia.

Source: Janny Scott, "A Free-Spirited Wanderer Who Set Obama's Path," *New York Times*, March 13, 2008. Copyright © 2008 The New York Times Co. Reprinted by permission.

Summary

1. Anthropology is the holistic, biocultural, and comparative study of humanity. It is the systematic exploration of human biological and cultural diversity across time and space. Examining the origins of, and changes in, human biology and culture, anthropology provides explanations for similarities and differences among humans and their societies.
2. The four subfields of general anthropology are (socio)cultural, archaeological, biological, and linguistic. All consider variation in time and space. Each also examines adaptation—the process by which organisms cope with environmental stresses.
3. Anthropology's biocultural perspective is a particularly effective way of approaching the topics of human biological diversity and "race." Because of a range of problems involved in classifying humans into racial categories, contemporary scientists focus on specific differences, such as in skin color, and try to explain them. Biological similarities between groups—rather than common

ancestry (the assumed basis of race)—may reflect similar but independent adaptation to similar natural selective forces. Cultural forces mold human biology, including our body types and images.

4. Cultural anthropology explores the cultural diversity of the present and the recent past. Archaeology reconstructs cultural patterns, often of prehistoric populations. Biological anthropology documents diversity involving fossils, genetics, growth and development, bodily responses, and nonhuman primates. Linguistic anthropology considers diversity among languages. It also studies how speech changes in social situations and over time.
5. Concerns with biology, society, culture, and language link anthropology to many other fields—natural sciences, social sciences, and humanities.
6. Anthropology has two dimensions: general and applied. The latter uses anthropological perspectives, theory, methods, and data to identify, assess, and solve social problems. The fields in which applied anthropologists work include business, government, economic development, education, and social services, action, and outreach. Applied anthropologists come from all four subfields.

Key Terms

adaptation (p. 3)	ethnology (p. 13)
anthropology (p. 2)	food production (p. 4)
applied anthropology (p. 18)	general anthropology (p. 4)
archaeological anthropology (p. 14)	holistic (p. 2)
biocultural (p. 9)	linguistic anthropology (p. 17)
biological (or physical) anthropology (p. 16)	natural selection (p. 10)
cultural anthropology (p. 12)	phenotype (p. 6)
cultural resource management (CRM) (p. 18)	primates (p. 16)
cultures (p. 2)	racial classification (p. 6)
ethnography (p. 12)	science (p. 17)
	sociolinguistics (p. 17)
	tropics (p. 10)



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